No. 648,333. Patented Apr. 24, 1900.

R. F. BARKER & M. CORRY.

STEAM SET WORKS FOR SAWMILL CARRIAGES.

(Application filed Sept. 19, 1899.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.

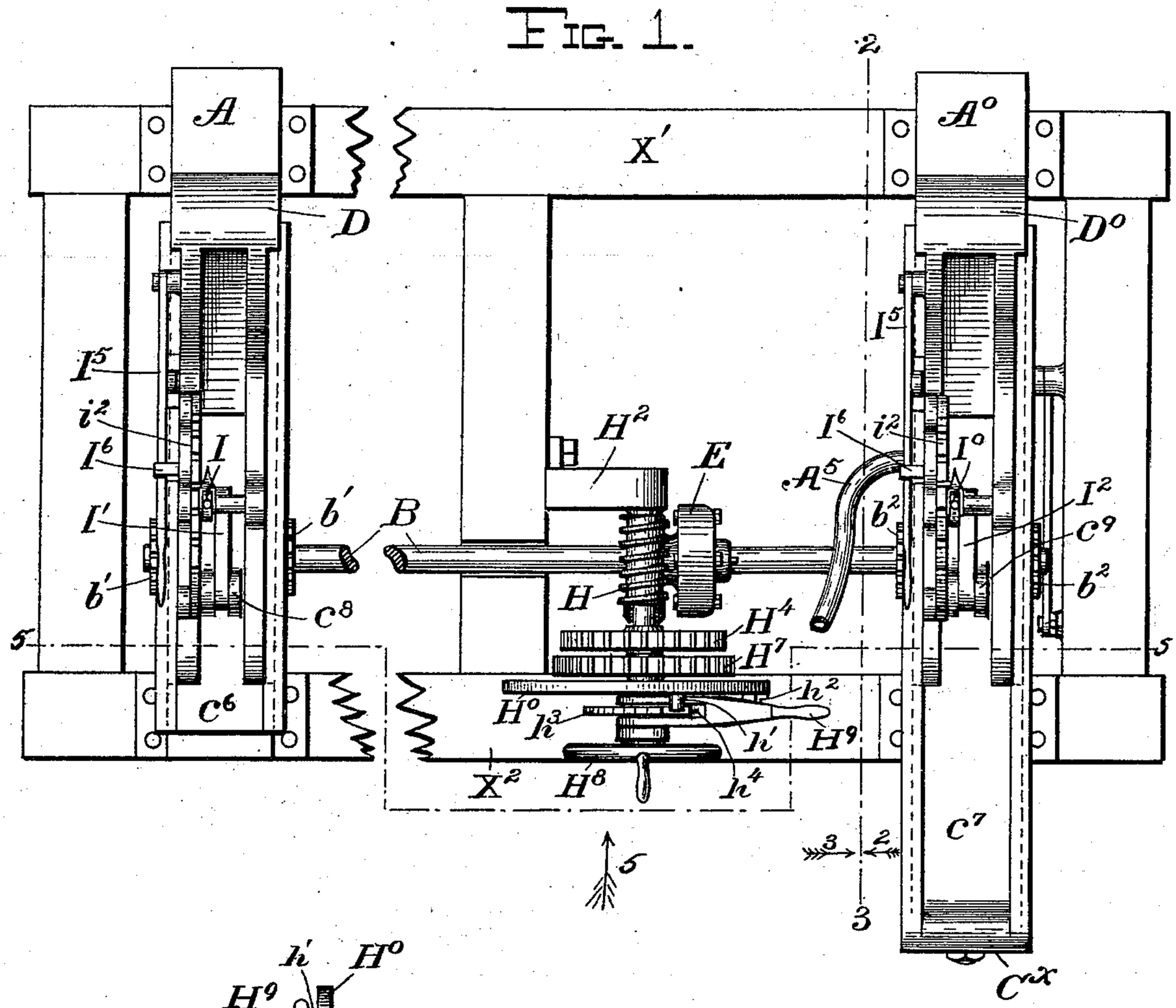

FIG. 2.

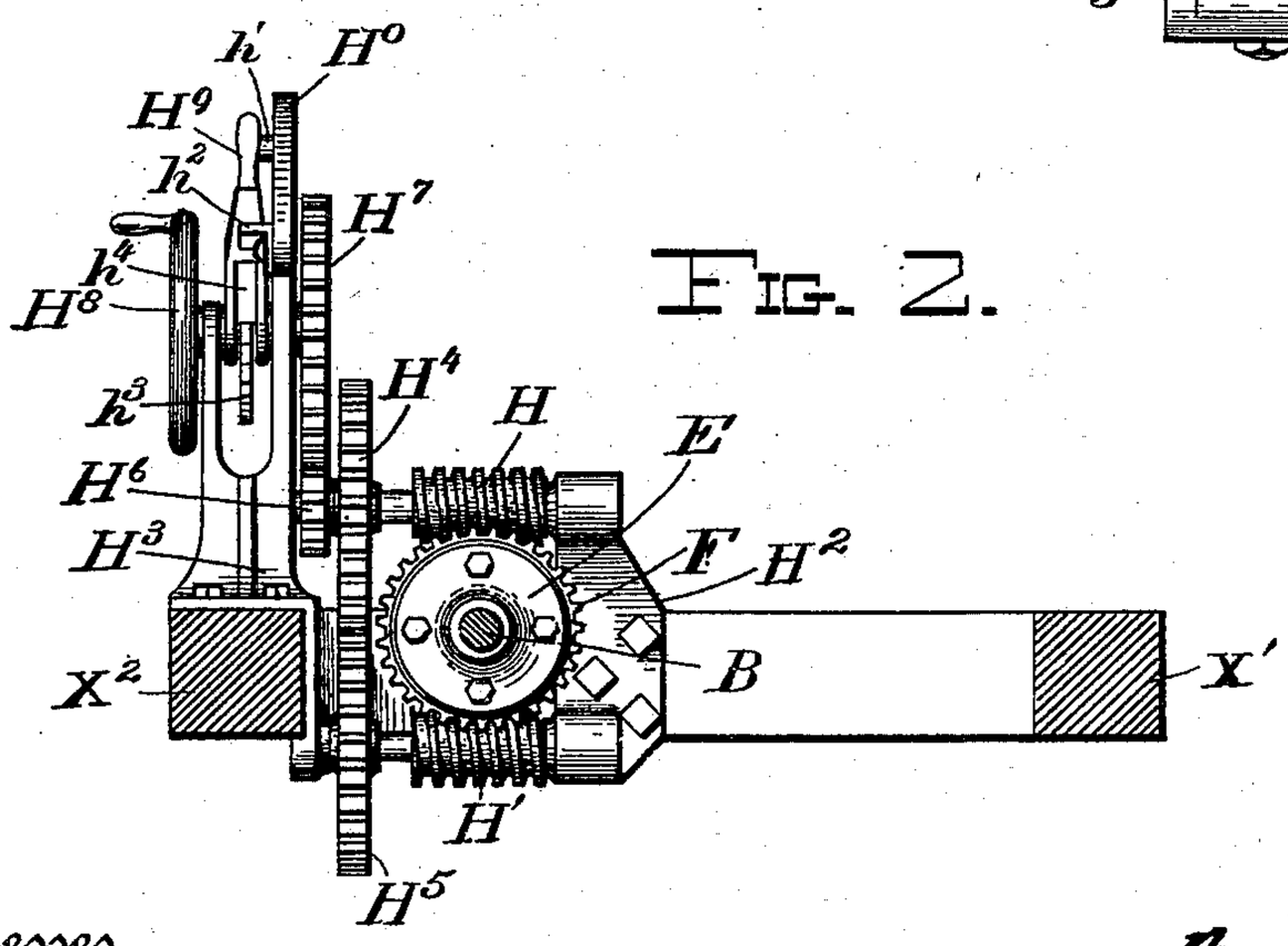

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FIG. 3.

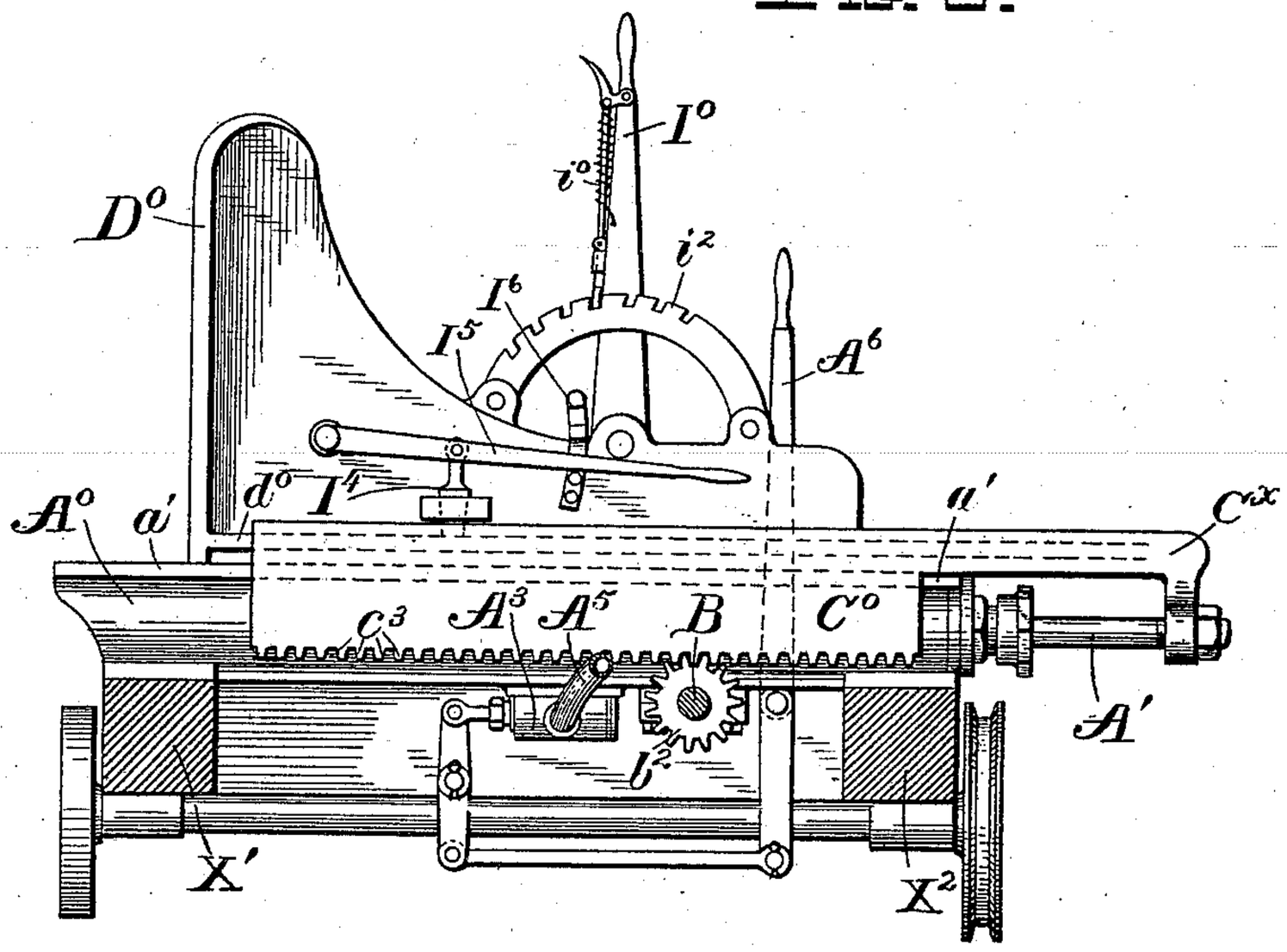

FIG. 4.

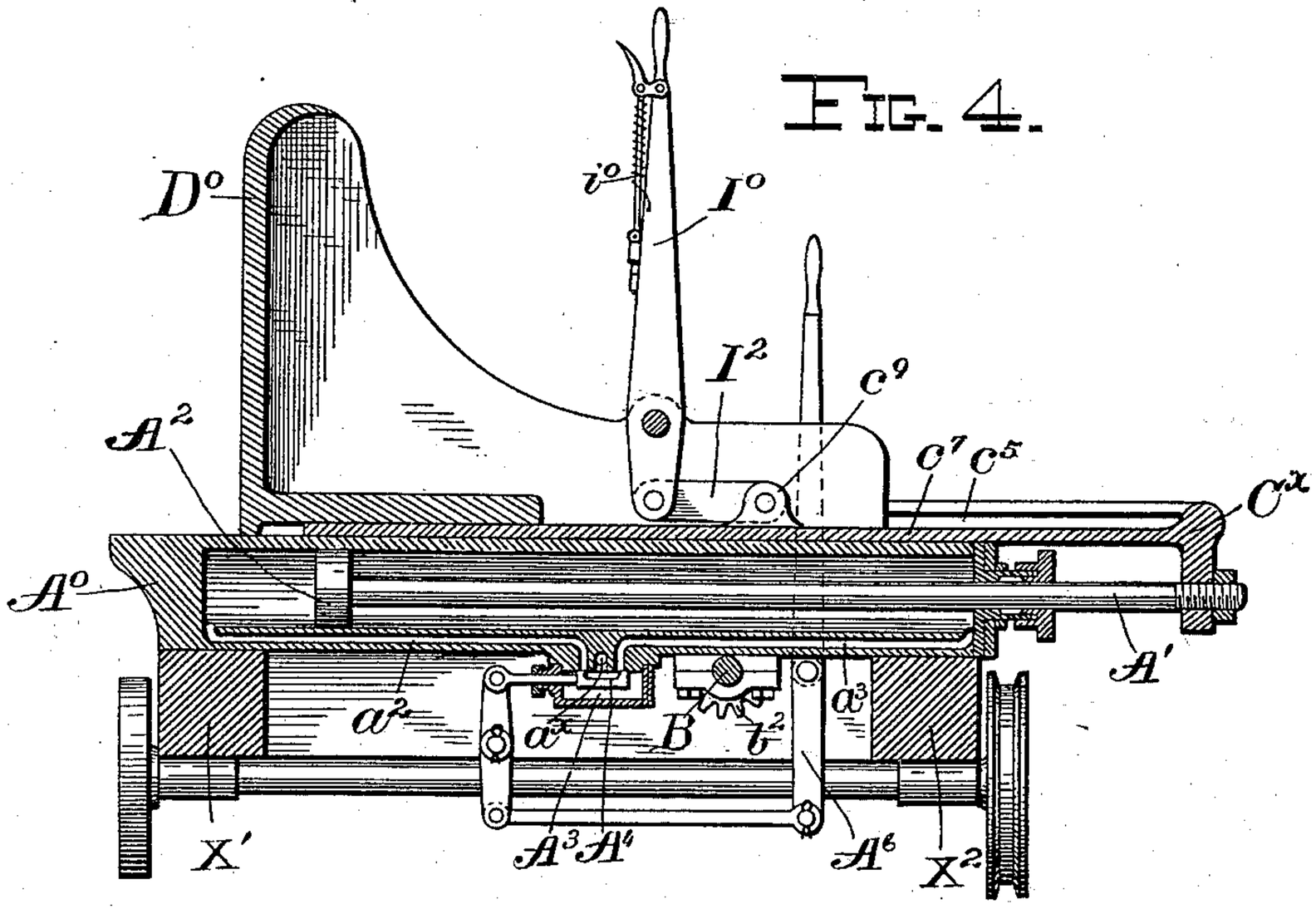

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FIG. 5.

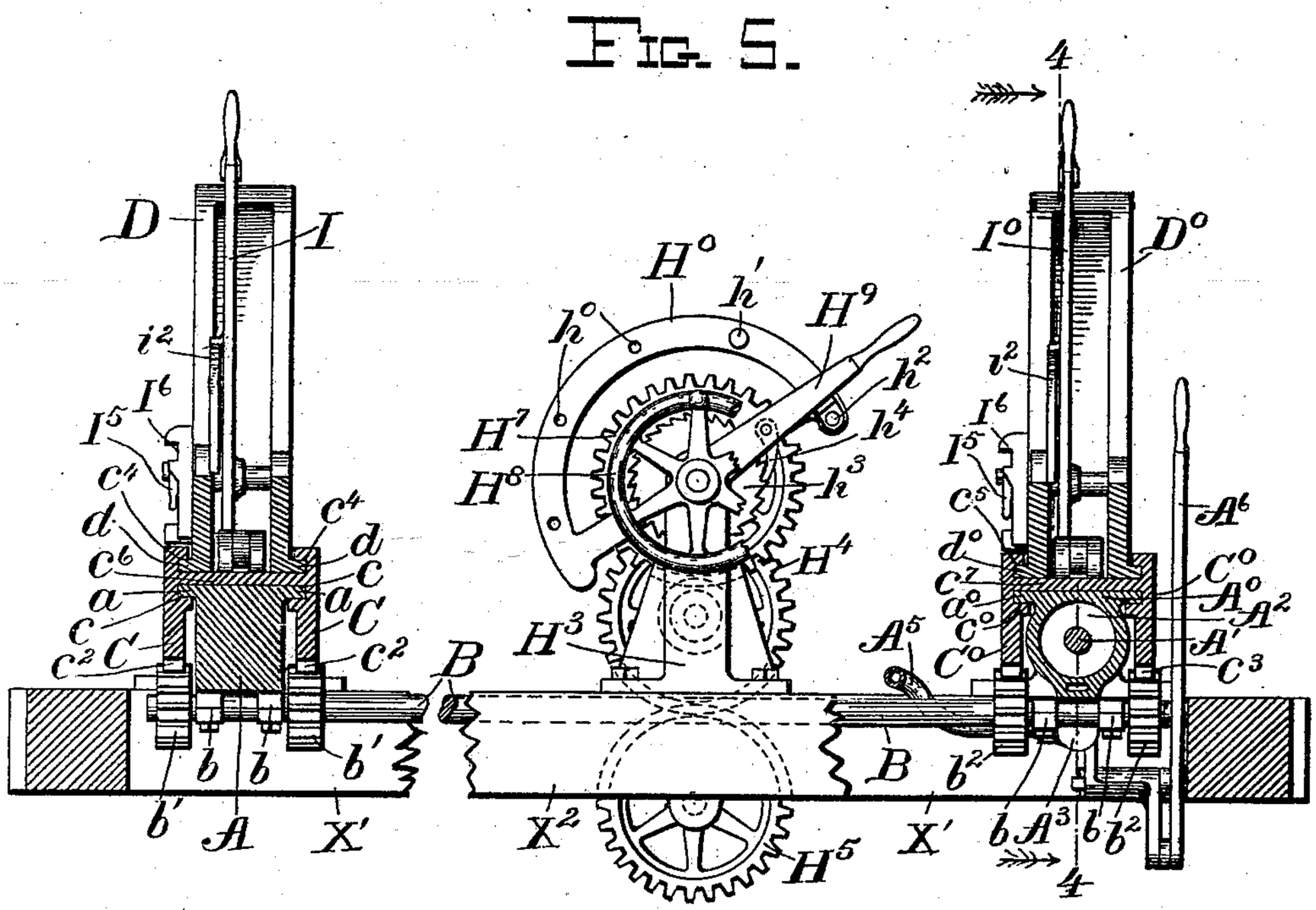


FIG. 6.

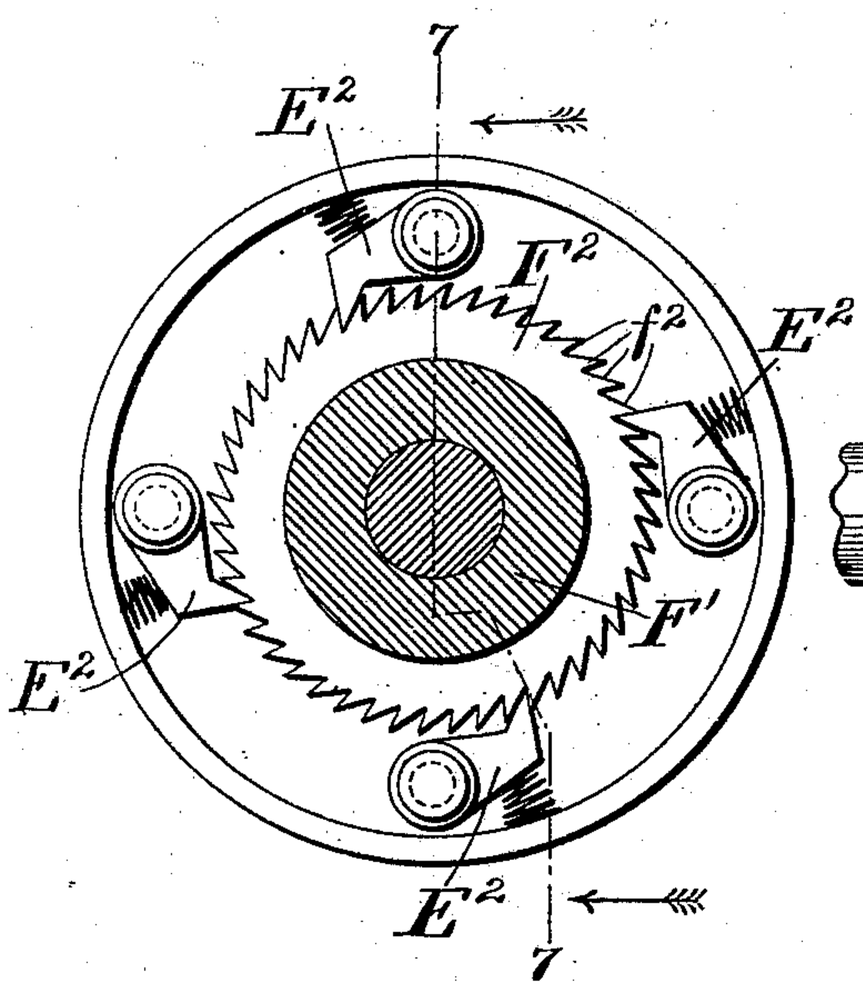
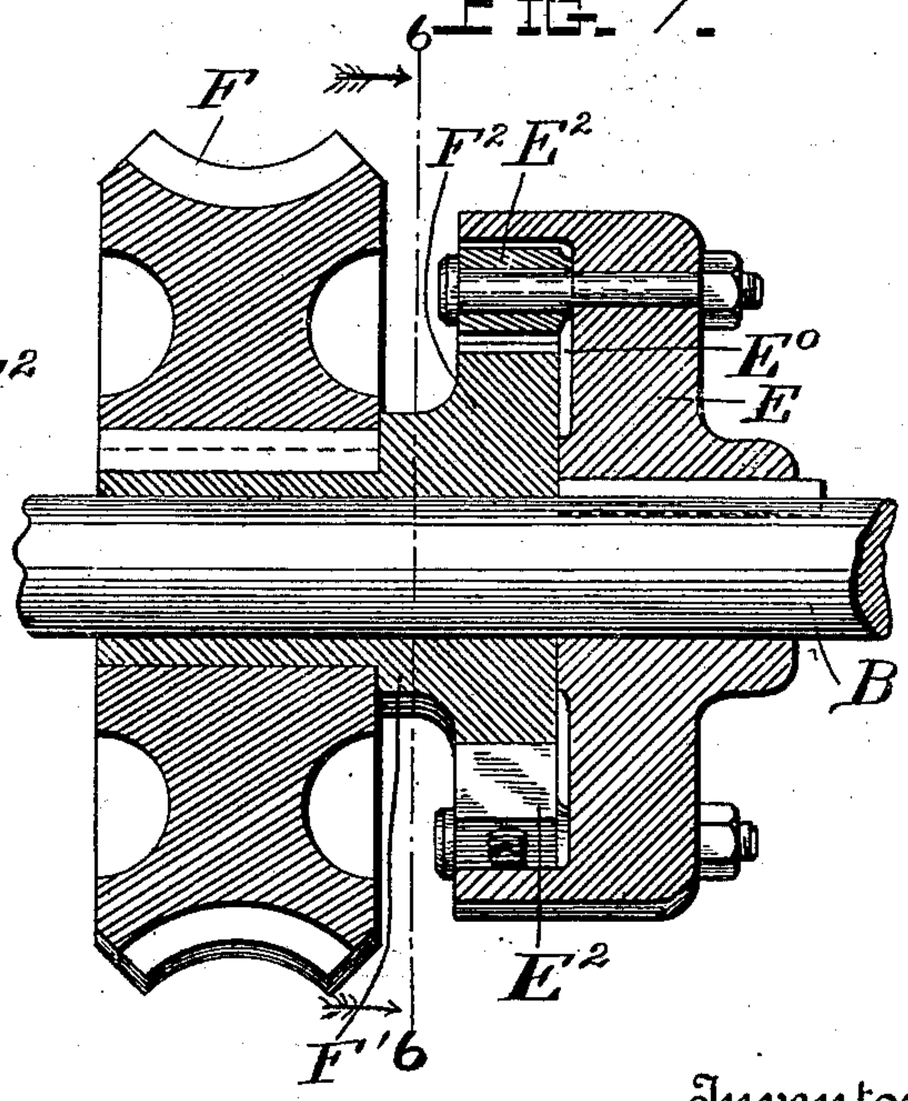


FIG. 7.



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UNITED STATES PATENT OFFICE.

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

STEAM SET-WORKS FOR SAWMILL-CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 648,333, dated April 24, 1900.

Application filed September 19, 1899. Serial No. 731,006. (No model.)

To all whom it may concern:

Be it known that we, RUBEN F. BARKER and MICHAEL CORRY, citizens of the United States, residing at Marinette, in the county of Marinette and State of Wisconsin, (whose post-office address is Menekaune, Wisconsin,) have invented certain new and useful Improvements in Steam Set-Works for Sawmill-Carriages; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in hand-controlled power-actuated set-works for sawmill-carriages; and the object is to provide means for quickly and accurately adjusting the set-works to cut boards of uniform thickness and for receding the knees of the head-blocks.

Our invention will be understood by reference to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 is a top plan view of a sawmill-carriage provided with our pressure-actuated set-works. Fig. 2 is a sectional view taken on the line 2 3 in Fig. 1 and looking in the direction of the arrow 2. Fig. 3 is a sectional view taken on the line 2 3 in Fig. 1 and looking in the direction of the arrow 3 in said figure. Fig. 4 is a sectional view taken on the line 4 4 in Fig. 5 looking in the direction of the arrow. Fig. 5 is a sectional view taken on the line 5 5 in Fig. 1 and looking in the direction of the arrow 5. Fig. 6 is an enlarged sectional view taken on the line 6 6 in Fig. 7 and looking in the direction of the arrow, showing the ratchet-and-pawl escapement whereby the worm-gear is locked upon the shaft; and Fig. 7 is a sectional view taken on the line 7 7 in Fig. 6.

A A^0 represent the head-blocks, mounted upon the sills X' X^2 transversely of the carriage in the ordinary way.

B represents the set-shaft, journaled in brackets *b* beneath the head-blocks A A^0 and provided with pairs of pinions b' b' and b^2 b^2, fixed thereon adjacent to and upon opposite sides of the head-blocks A A^0, respectively.

C C^0 represent double rack-bars which fit over and are arranged to slide along the head-blocks A A^0, the flanges a a^0 on the said head-blocks engaging in corresponding grooves or slideways c c^0 within the said rack-bars C C^0, respectively. These rack-bars have double sets of teeth c^2 c^3, with which engage the pairs of pinions b' and b^2, respectively, on opposite sides of the said head-blocks A A^0, as seen most clearly in Figs. 3 and 5.

The double rack-bars C C^0, which inclose the head-blocks A A^0, carry the knees D D^0, the latter having oppositely-disposed flanges d d^0, engaging in corresponding grooves c^4 c^5 in the upper portion of the rack-bars C C^0, respectively, and resting upon the transverse webs c^6 c^7, which rigidly connect the two members of the rack-bars, as seen most clearly in Fig. 5.

The head-block A^0 consists of a cylinder of a length equal to the travel of the knees and has its upper side formed of an exterior appearance and configuration similar to the head-block A. This steam-cylinder head-block A^0 is provided with steam-passages a^2 a^3, connected midway of the length of the cylinder with a valve-chamber A^3, provided with an exhaust-opening $a^\times$ and fitted with a sliding valve A^4. This valve is under the control of the operator for admitting steam upon either side of the piston, which may enter through a connecting-pipe A^5 (shown in Fig. 3) by means of the pivoted hand-lever A^6 and its connections. (Seen most clearly in Figs. 3, 4, and 5.)

The cylinder-head block A^0 is fitted with a piston A^2, connected to a piston-rod A', which piston-rod is in turn connected to a rearward extension $C^\times$ upon the double rack-bar C^0, which straddles the cylinder-head block A^0, as hereinbefore described.

The steam-pressure is constantly on within the valve-chamber A^3 and is admitted to either side of the piston A^2 by the proper manipulation of the hand-lever A^6, which actuates the valve A^4 at the will of the operator.

The piston A^2 and its connecting-rod A' in their movement either forward or backward at the will of the operator causes a corresponding equal movement of the rack-bar C^0, and this rack-bar, having its teeth c^3 meshing with the pinions b^2 on the set-shaft B, causes the rotation of the set-shaft, which in turn com-

municates its movement to the rack-bar C and causes the latter, carrying the knee D, to move in unison with the rack-bar C^0, carrying the knee D^0. When the knees are at their rearward position, as when starting to saw a log, the valve A^4 is moved to admit steam-pressure behind the piston A^2, thus giving a forward pressure to the rack-bars C^0 and C and the corresponding knees D^0 and D, and this pressure is maintained until the last board has been sawed from the log and until it is desired to recede the knees to allow a new log to be placed upon the carriage. This constant pressure forward upon the knees, as above described, is controlled and allowed to actuate the knees only at intervals and to a limited extent, dependent upon the thickness of the board to be sawed, by locking devices connected with the set-shaft, as hereinafter described.

Referring now more particularly to Figs. 6 and 7, E represents a wheel or disk having its hub keyed in a fixed position upon the set-shaft and carrying within its concave face E^0 a series of spring-pressed pivoted pawls E^2.

F represents a worm-gear which is rigidly connected to a sleeve F', having a boss F^2, provided with peripheral ratchet-teeth f^2, the boss F^2 on the sleeve F' fitting within the concavity E^0 of the disk E and the pawls E^2 engaging the ratchet-teeth f^2 on the said boss. The said sleeve F' is mounted loosely upon the set-shaft B, and ratchet-teeth f^2 and interlocking pawls E^2 are so arranged and constructed that forward rotation of the set-shaft is prevented so long as the worm-gear F is held against rotation; but the said set-shaft, with the disk E and the pawls carried thereby, may rotate freely under backward pressure upon the piston A^2 within the cylinder A^0, notwithstanding that the worm-gear F be held stationary during such backward movement. This arrangement is to allow the forward feed to be controlled by the operator, while the knees may be receded continuously and quickly by reversing the pressure within the cylinder A^0.

The worm-gear F is locked against rotation by means of a pair of worms H and H', which mesh with the teeth upon the worm-gear F at opposite sides of its periphery, as seen most clearly in Fig. 2.

The worms H and H' are mounted at one end in bearings therefor upon a bracket H^2 and at their opposite ends in suitable bearings upon the bracket H^3. Intermeshing toothed gears H^4 and H^5, fixed upon the shafts of the worms H and H', respectively, allow the said worms to be rotated in unison, and a pinion H^6, mounted upon the shaft of one of the worms H, meshes with a larger gear H^7, mounted upon a shaft journaled transversely of the bracket H^3, upon one end of which shaft is also mounted a hand-wheel H^8 for rotating said shaft, and with it the gear H^7 and the train of gears connecting the latter with the worms H and H', through the rotation of which the worm-gear F may be caused to rotate. The worms H and H' may be rotated continuously through the train or gears hereinbefore described by means of the hand-wheel H^8; but in setting up the log for each new board there must be some arrangement for rotating this train of gears with uniformity. For this purpose we provide a rocking lever H^9, which is loosely mounted upon the axis of the gear H^7 and the hand-wheel H^8, by means of which a predetermined degree of rotation may be given to the train of gears each time the log is to be set up for sawing a new board. This rocking lever H^9 works in conjunction with a fixed segmental bar or quadrant H^0, provided with a series of openings h^0 for receiving a stop-pin h', adjustable for varying the degree of throw allowed to the lever H^9 and the consequent degree of rotation to be imparted to the train of gears. This segmental bar H^0 is provided at one end with a fixed stop h^2, which arrests the forward movement of the rocking lever H^9, as the adjustable stop h' limits the backward movement thereof, as will be clearly understood by any one skilled in the art. A ratchet-wheel h^3 is fixed upon the shaft of the gear H^7, and the rocking lever H^9 carries a pawl h^4, arranged to engage the teeth of the said ratchet-wheel as the said lever is thrown over to the right or forward position. Thus as the rocking lever H^9 is thrown over to the left or backward position, it moves successively over the teeth of the said ratchet-wheel until arrested by the adjustable stop h', and then upon the said lever being thrown to the right or forward position the pawl h^4, engaging the ratchet-teeth of the wheel h^3, causes a partial rotation of the said ratchet-wheel and its connecting train of gears hereinbefore described. The forward rotation of the set-shaft is by means of the train of gears and the rocking lever above described placed entirely within the control of the sawyer for setting up the knees uniformly the desired distance. When it is desired to recede the knees, the sawyer reverses his valve-lever A^6—that is to say, he throws it to the right, or backward as seen in Figs. 3 and 4, admitting steam-pressure in front of the piston A^2 and allowing the pressure in the rear thereof to exhaust through the exhaust-passage $a^\times$ in the valve-chamber. Inasmuch as the set-shaft is free to rotate backwardly, the knees may be receded instantly by this simple backward pull upon the valve-lever A^6, as above described.

In ordinary head-blocks for sawmill-carriages there are commonly two modes of constructing them, one of which consists in providing a hand mechanism with a locking device for adjusting each knee independently of the setting mechanism, in order to accommodate tapering logs, and by means of the hand-lever any required knee may be moved forward out of its normal position a limited distance, but commonly as far as the taper of the logs demands, after which the knee is

drawn back to its normal position by said hand-lever. To accomplish this, it is necessary to mount the knees upon the head-block bases so that they can slide thereon independently of the setting-racks which engage with the setting-pinions; but in order to limit the independent movement of the knees it is customary to provide fulcrumed hand-levers with locking-catches and other suitable connections by which the knees are attached or fulcrumed to the setting-racks, so that each knee can be adjusted to a tapering log by the hand-lever and at the same time maintain its connection with the setting-racks for regular work. The other mode of constructing head-blocks is to omit altogether "taper-setting" mechanisms, so called, and to provide merely a base having the sliding knee mounted thereon, the setting-racks being permanently secured to the knees, which are thereby directly actuated by the setting-pinions.

Now it will be seen that the set-works shown and described in this application specifically relate to the former mode of construction, as the knees are independently mounted in the rack-bars, as clearly shown in Fig. 5, and are adjustably connected thereto by the hand-lever I or I^0 and links I' or I^2, as shown in Figs. 3 and 4, while the power derived from the cylinders is applied directly to the rack-bars C or C^0 to move the knees forward or recede them. It is not our intention, however, to limit our invention in this respect to the precise form of construction herein set forth, because it is equally as applicable to knees having the rack-bars permanently fixed thereto and which have no action independent of the rack-bars. Therefore we broadly claim the method of operating head-block knees herein set forth, whether applied to head-blocks with adjustable knees for tapering logs or to those having no such adjustment. We do not wish to be understood as claiming the hand-lever mechanism for taper-setting as herein shown and described, for that is old; but what we do claim in our invention is its adaptability to receive any approved form of taper-setting mechanism whereby the knees may have a limited movement independent of the setting-racks, and we have shown herein one method of applying such a mechanism. We observe, further, that the precise construction of our invention shown herein limits the employment of a power-cylinder to one head-block, from which power is distributed not only to the knee mounted directly thereupon, but also to all the knees of all other head-blocks on a sawmill-carriage. Obviously in cases where a number of head-blocks are located upon a long carriage for long logs it is desirable to employ two or more head-blocks with power-cylinders therein. We do not wish, therefore, to limit our claim to one cylinder only, but, on the contrary, to broadly claim their embodiment in one or more head-blocks on carriages of sawmills. The knee may also be locked in its independently-adjusted position by means of a taper-pin I^4, carried by a pivoted hand-lever I^5, passing through a lug D^6 on the knee and arranged to engage in an opening in the upper side of the corresponding rack-bar, as seen most clearly in Fig. 3. The hand-lever I^5 may be supported in position to hold the said taper-pin out of engagement by means of a notched bar I^6, if desired, although this is not essential.

It should be understood that we do not limit ourselves to the embodiment of the actuating-cylinder and piston with but one of the head-blocks, as in the case of a sawmill-carriage having a number of knees greater than two or three two or more of the head-blocks would be formed as power-cylinders, and it may be preferred to form power-cylinders in both head-blocks of a carriage having but two knees; but as these variations would involve merely a duplication of parts herein shown and described they will be readily understood without further specific illustration or description.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. In sawmill set-works, the combination with set-shaft having pinions thereon; head-blocks; rack-bars carrying the knees mounted upon said head-blocks and pinions on said shaft meshing with said rack-bars; of a steam-cylinder formed within one of the head-blocks; a piston working in said cylinder connected to one of said rack-bars; means for controlling the pressure within said cylinder and means for controlling the movement of the set-shaft, substantially as described.

2. In power set-works for sawmill-carriages, the combination with the set-shaft; pinions thereon; rack-bars having teeth meshing with pinions on said shaft, and carrying the knees; of one or more power-cylinders mounted transversely of the carriage and each constituting one of the head-blocks, and supporting a rack-bar and its knee; a piston in each cylinder; a piston-rod connected to each of said pistons and connected directly to the corresponding rack-bar; and means for controlling the pressure within each of said cylinders, substantially as described.

3. In power set-works for sawmill-carriages, the combination with the set-shaft; a disk fixed thereon, and pivoted pawls carried by said disk; of a worm-gear mounted loosely upon said set-shaft and having a concentric extension provided with ratchet-teeth in engagement with said pawls; said ratchet-and-pawl mechanism allowing free backward turning of the said set-shaft while said worm-gear is stationary, but arresting the forward rotation thereof; and worms meshing with said worm-gear and under the control of the operator for regulating the forward movement of the knees, substantially as described.

4. In sawmill set-works, the combination with the set-shaft having pinions thereon;

head-blocks; double rack-bars mounted over said head-blocks and meshing with said pinions, said rack-bars having head-blocks therein and being movable along said head-blocks; and knees mounted upon said rack-bars; of a power-cylinder one or more arranged transversely of the carriage; a piston working therein, the piston-rod being connected to said rack-bars, and means for admitting pressure to either end of said cylinder, substantially as described.

5. In sawmill set-works, the combination with the set-shaft; pinions mounted thereon; head-blocks; double rack-bars mounted over said head-blocks and engaging said pinions; knees adjustably mounted on said rack-bars; means for independently adjusting said knees; of a power-cylinder arranged transversely of the carriage; a piston working therein, the piston-rod being connected to said rack-bars and means for admitting pressure to either end of said cylinder, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

RUBEN F. BARKER.
MICHAEL CORRY.

Witnesses:
W. W. SKINNER,
M. O. KOHLER.