

No. 721,160.

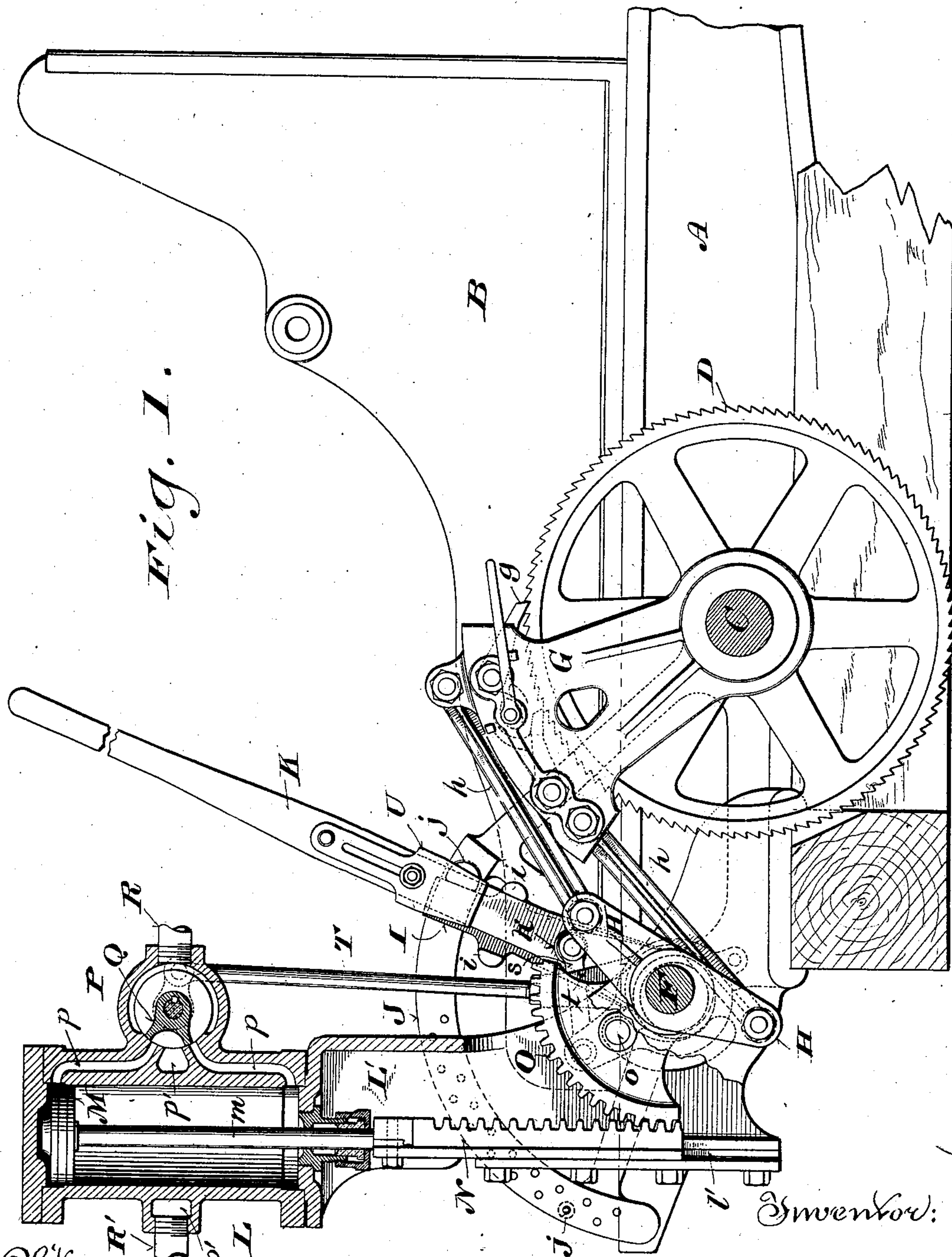
PATENTED FEB. 24, 1903.

A. CUNNINGHAM.
SET WORKS FOR SAWMILL CARRIAGES.

APPLICATION FILED MAY 12, 1900.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses:
Geo. W. Young
Chas. L. Goss.

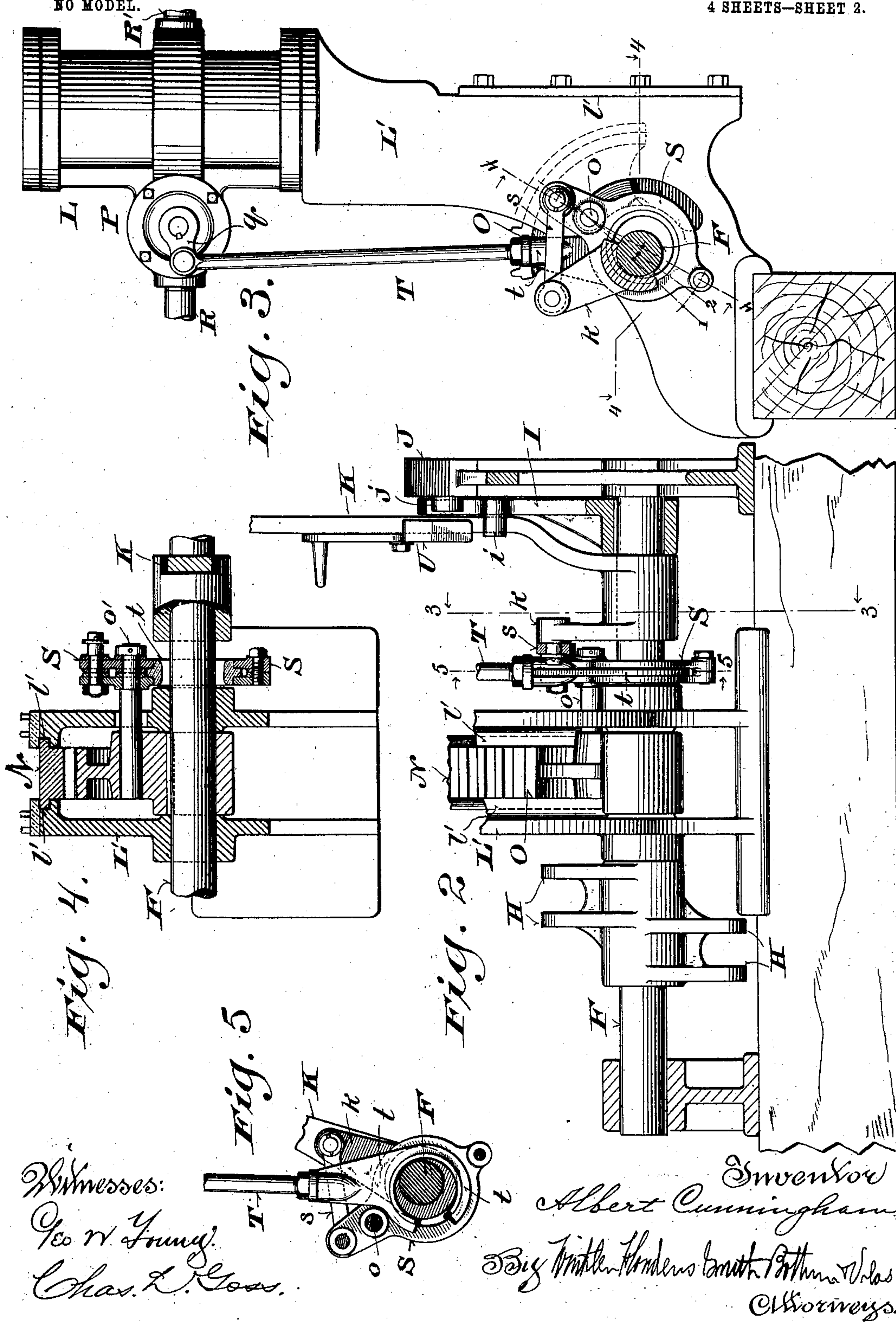
Inventor:
Albert Cunningham,
By *Antler Henderson Smith & Co.*
Attorneys.

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4 SHEETS—SHEET 2.



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Geo. W. Young.
Chas. L. Goos.

Inventor
Albert Cunningham,
By Miller, Henders & Smith, Attorneys
at Law.

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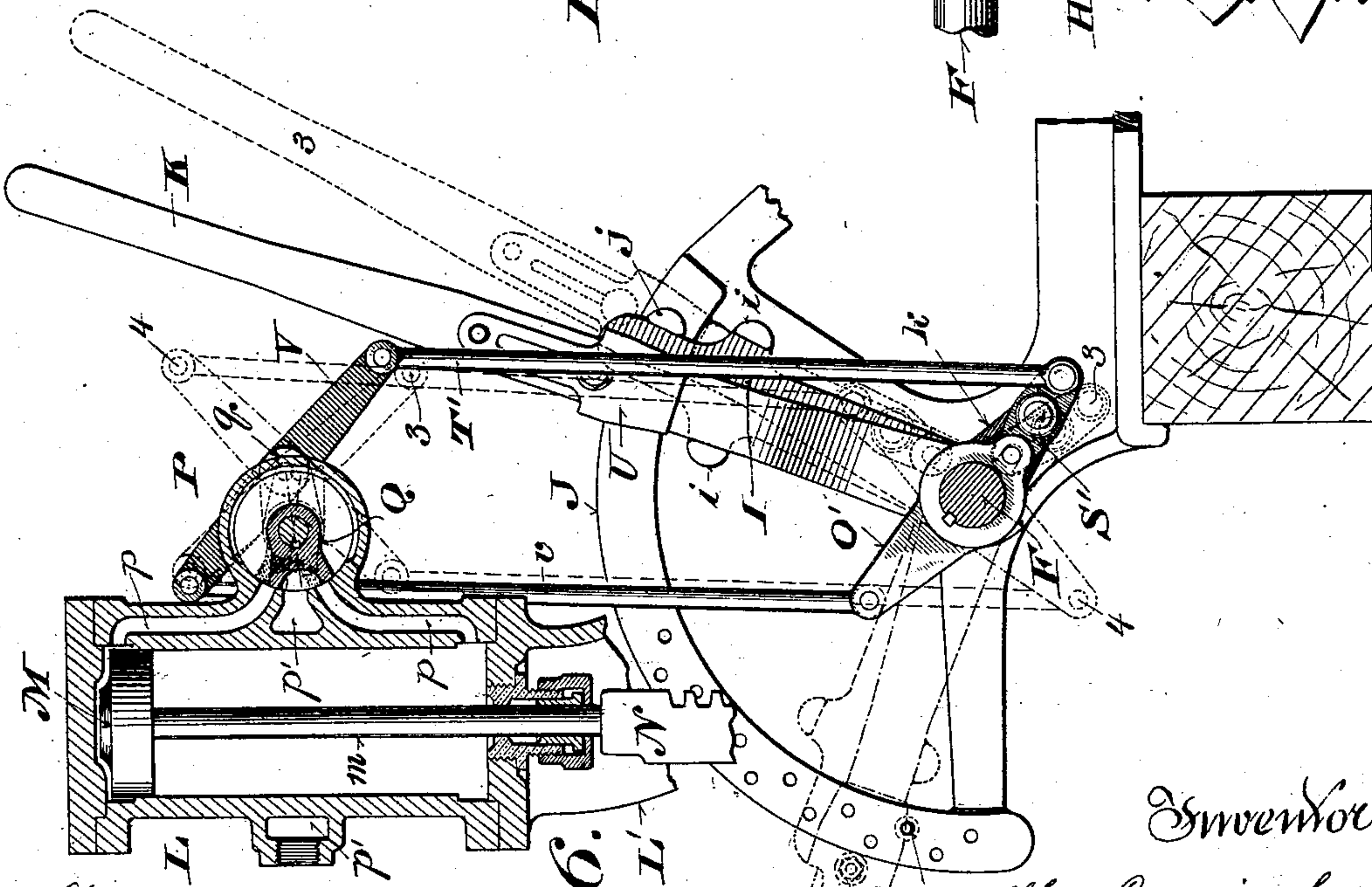
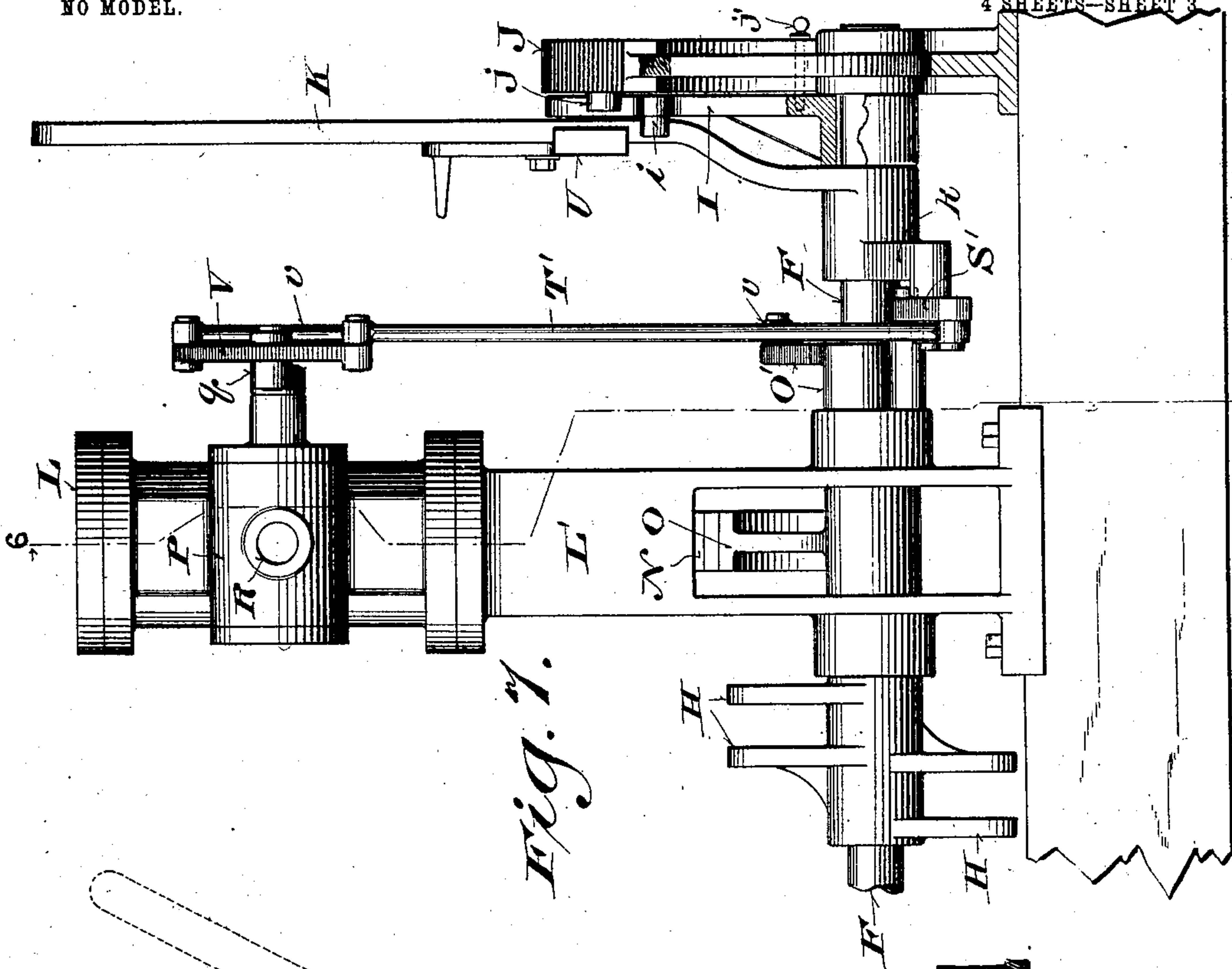
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4 SHEETS—SHEET 3



Witnesses:
Geo. W. Young.
Chas. L. Cox.

Fig. 6.

Inventor:
Albus Cunningham,
By *Wm. H. H. Smith*
Attorneys.

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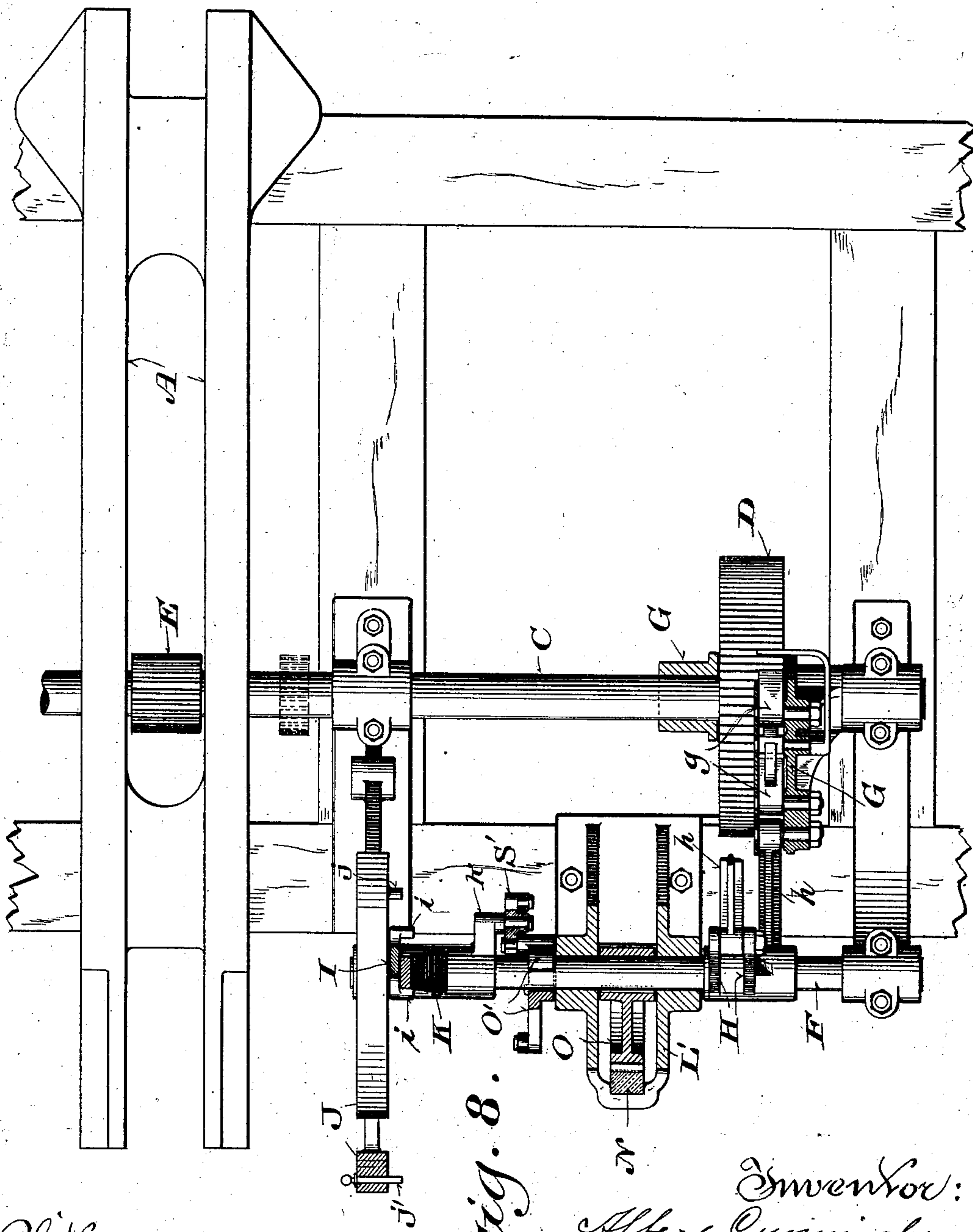
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NO MODEL.

4 SHEETS—SHEET 4.



Witnesses:

Geo W Young.

Chas. L. Goss.

Inventor:
Albert Cunningham,

By Andrew Gordon Smith & the others

Ornery.

UNITED STATES PATENT OFFICE.

ALBERT CUNNINGHAM, OF MILWAUKEE, WISCONSIN.

SET-WORKS FOR SAWMILL-CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 721,160, dated February 24, 1903.

Application filed May 12, 1900. Serial No. 16,397. (No model.)

To all whom it may concern:

Be it known that I, ALBERT CUNNINGHAM, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Set-Works for Sawmill-Carriages, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The main objects of my invention are to apply power to the operation of the set-works in such a way that it may be brought into action and controlled by the manipulation of a lever in accordance with the customary mode of hand-setting in such a way that the initial movement of the lever in either direction will cause the power to act in a corresponding direction upon the set-works until the lever is stopped or comes to rest at any point, whereupon the power will be automatically cut off and the movement of the set-works arrested, to graduate the power according to the work to be done, to permit the operation of the set-works by hand in the usual way without employing the auxiliary power, and generally to improve the construction and operation of power set-works.

It consists in a certain novel construction and arrangement of parts, as hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a side elevation and vertical section of one form of set-works embodying my invention. Fig. 2 is a front elevation and vertical section of a part of the mechanism shown in Fig. 1 as viewed from the right with reference to that figure. Fig. 3 is a side elevation and vertical section on the line 3 3, being a reverse view of a part of the mechanism shown in Fig. 1. Fig. 4 is a horizontal section on the line 4 4, Fig. 3. Fig. 5 is a vertical cross-section on the line 5 5, Fig. 2. Fig. 6 is a side elevation and vertical section on the line 6 6, Fig. 7, of a modified form of a part of the mechanism shown in Fig. 1. Fig. 7 is a rear elevation thereof; and Fig. 8 is a plan view and horizontal section shown in Figs. 6 and 7 in connection with a portion

of a sawmill-carriage, set-shaft, and head-block.

Referring to Figs. 1 to 5, inclusive, A designates one of the head-blocks of a sawmill-carriage, B one of the knees or standards mounted and movable lengthwise upon said head-block, and C the set-shaft supported in suitable bearings lengthwise of the carriage and provided with a ratchet-wheel D and, as shown in Fig. 8, with pinions E, which mesh with racks on the knees or standards B.

F is a rock-shaft supported in suitable bearings on the back side of the carriage parallel with the set-shaft C.

G G are vibrating pawl-carriers loosely mounted on the set-shaft C on opposite sides of the ratchet-wheel D and provided, as shown in Figs. 1 and 8, with pawls *g g*, which are adapted to engage with the teeth of said ratchet-wheel and turn it in one direction. These pawl-carriers are connected by links *h h* with oppositely-projecting arms *H H* on the rock-shaft F, so that as one pawl-carrier is moved forward the other will be moved backward, and when the mechanism is at rest, as shown in Fig. 1, the two pawl-carriers will be directly opposite each other.

The parts above described are in construction, arrangement, and operation like or similar to those ordinarily employed in sawmill set-works and do not of themselves constitute my invention, but are essential parts of a complete set-works, and therefore necessary to a full and clear understanding of my improvements.

I is an arm fixed upon the shaft F and provided with opposing stops *i i*.

J is a quadrant mounted on the carriage-frame next to the arm I and provided with a fixed stop *j* and an adjustable stop *j'*, by which the movement of the arm I and the rock-shaft F is limited in both directions and varied for cutting lumber of different dimensions.

K is a lever formed at its lower end with a hub or sleeve, which is loosely mounted on the shaft F next to the arm I. The stops *i i* on said arm project into the path of said lever and limit its independent movement in both directions. The lever K, in connection with the arm I and its stops *i i*, affords means

for operating the set-works by hand in the usual way. At its lower end said lever is formed or provided with a crank-arm *k*, the purpose of which will be hereinafter explained.

L is the cylinder of a steam-engine or other suitable fluid-pressure motor for actuating or assisting to actuate the set-works. It is preferably supported in a vertical position on a standard *L'*, which is mounted on the carriage-frame. M is the piston fitted in said cylinder and connected by its rod *m*, which passes through a stuffing-box in the lower head of said cylinder, with a rack N, guided in vertical ways *l'* in the standard *L'*. The rack N meshes with a segment-gear O, fixed on the shaft F. The cylinder L is formed or provided on one side with a valve-case P, which communicates, through passages *p p*, with opposite ends of said cylinder and with an intermediate exhaust-passage *p'*.

Q is a rocking valve fitted to turn in said valve-case and formed with a recess or cavity which in the central position of said valve extends slightly over the ports of the passages *p p*, and thereby establishes communication between both ends of the cylinder and the exhaust-passage *p'*. The stem of said valve projects at one end through the valve-case and is provided with a crank-arm *q*, as shown in Fig. 3.

R is the supply-pipe, leading into the valve-case P.

R' is the exhaust-pipe, leading out of the passage *p'*, which is shown as extending around the cylinder L.

S is a lever formed with an opening through which the shaft F passes and connected by a link *s* with the crank-arm *k*. It is pivoted between the shaft F and the link *s* on a pin *o*, projecting from one side of the gear O through a slot in one side of the standard *L'*, as shown in Figs. 2, 3, and 4. It is also pivotally connected with the head *t* on the lower end of a rod T, which is pivotally connected at its upper end with the arm *q* on the stem of the valve Q. For the purpose of making the parts right or left the lever S is made in two sections, which are bolted together on opposite sides of the head *t*, and the head *t* is made with a large opening through which the shaft F passes and is formed on opposite sides around said opening with circular flanges, which are fitted to turn in the circular openings in the sections of lever S, as shown in Figs. 4 and 5.

The crank-arm *k* may be connected directly by a pivot-pin with the lever S, one of the connected parts having a slotted opening to receive said pin and allow for the arc movement of said lever in turning upon the pivot-pin *o*, thereby dispensing with the link connection *s*.

U is a tapered block or slide mounted upon the lever K and movable endwise thereon between the stops *i i*, so as to vary the amount of play between said lever and the arm I or,

if desired, to take up all of the play between said parts and lock them together.

My improved set-works hereinbefore described operates as follows: The parts of the mechanism being at rest, as shown in Fig. 1, with the lever K against the front stop *i* and the arm I against the home-stop *j*, the valve Q will stand in the position shown in Fig. 1 to admit steam or other actuating fluid through the lower passage *p* into the lower end of the cylinder L and to release the steam or actuating fluid from the upper end of said cylinder, and the piston M will thus be held at the upper limit of its stroke. If now the lever K is thrown backward by the operator, its initial movement in passing from the front to the back stop *i* will operate through the arm *k* and link *s* to turn the lever S upon the pivot-pin *o* from a position indicated by the oblique dotted line 4 4 on Fig. 3 into the position indicated by the dotted line 1. This movement of the lever S operating through the connecting-rod T will turn the valve-arm *q* upward and the valve Q downward, thereby establishing communication through the upper passage *p* between the fluid-pressure supply and the upper end of said cylinder and opening the lower end of said cylinder through the lower passage *p* to exhaust. The piston M will thereupon be forced downward with the rack N, which, operating through the gear O, will turn the shaft F and arm I in the same direction as that given to the lever K by the operator. When the lever K is arrested at any point or its movement is checked, the slight continued movement of the gear O required to bring the arm I into a central position with relation to the lever K will through the pivot-pin *o* turn the lever S on its pivot connection with the link *s* as a fulcrum backward or downward into the position indicated by the dotted line 2 on Fig. 3, and this movement of said lever communicated through the connecting-rod T and valve-arm *q* to the valve Q will turn said valve into its middle position, in which it will cut off the admission of the actuating fluid to both ends of the cylinder and open them to exhaust through the passages *p p* and *p'*. The piston M, and hence the set-works with which it is operatively connected, will thus be stopped and will remain quiescent until the lever K is again moved by the operator. In case said lever is returned at once against the front stop *i*, as in the ordinary operation of the set-works, the valve Q will be shifted back into its original position, thereby admitting the actuating fluid to the lower end of cylinder L and releasing it from the upper end of said cylinder, in consequence of which the parts will resume their original positions, as shown in Fig. 1. In the manipulation of set-works of this kind it is customary to move the setting-lever backward and forward for each advance movement of the standards or knees B on the head-blocks A,

the stop j' being adjusted to limit the backward throw of said lever and the arm I for any thickness or dimension of lumber it may be desired to cut. The initial movement of the lever K backward applies the power in the manner above explained to move the arm I in the same direction as long as said lever is carried by the operator in advance of said arm. When its movement is arrested by the operator, the movement of the arm I by the motor will also be arrested, and upon reversing the movement of said lever the movement of the arm I by the motor will also be reversed, so that the movements of the arm I and the operation of the set-works by the motor will be under absolute control of the lever K and correspond exactly with the movements imparted to said lever by the operator.

In case the auxiliary power is too strong for setting small logs or light lumber it may be reduced by thrusting the tapered slide U between the stops i i' , so as to take up more or less of the lost motion between the lever K and the arm I, and thus reduce the independent movement of said lever by which the valve Q is opened.

In case it is desired to operate the set-works in the usual way entirely by hand without the aid of the motor the slide U may be adjusted to take up all the play between the lever K and arm I and cause them to act as a simple lever, rigidly fastened on the shaft F.

Referring to the modified form of the apparatus shown in Figs. 6 to 8, inclusive, a lever V is pivoted between its ends on the crank-pin of the valve-arm q and is connected at one end by a rod T' with one end of a lever S', which is pivoted between its ends on the crank-pin of the arm k of lever K. The other end of the lever S' is forked and pivotally connected with the shorter arm of a lever O', fixed on the shaft F. The other longer arm of said lever O' is connected by a rod v with the other arm of the lever V. The operation of this modified arrangement of the apparatus is substantially like that of the apparatus hereinbefore described. When the arm I is against the home stop j and the lever K is against the front stop i , the valve Q will be held in a position to admit the actuating fluid to the lower end of the cylinder L and release it from the upper end of said cylinder, as indicated by dotted lines 3 on Fig. 6. The piston M will thus be held at the upper limit of its stroke. If under these conditions the lever K is swung backward against the back stop i on the arm I, it will operate through the arm k to turn the lever S' upward on its pivot connection with the lever O' as a fulcrum, and the lever S', acting through the connecting-rod T', will turn the lever V upward on its pivot connection with the rod v as a fulcrum. The valve-arm q will thus be turned upward and the valve Q downward into the position in which it is shown by full

lines in Fig. 6. The actuating fluid will now be admitted to the upper end of the cylinder L and released from the lower end of said cylinder, and the piston M will be driven downward. The arm I through its connections with the motor will be thus caused to follow up the movement of the lever K until it reaches a position central with relation thereto, whereupon the actuating fluid will be cut off from both ends of the cylinder and the piston will be stopped. The movement of the lever O' as the arm I is brought up by the motor to a position central with respect to the lever K operates, through the lever S' and the connecting-rod T' and through the connecting-rod v , to lower both ends of the lever V and turn the valve Q into its middle position, in which it will cut off the actuating fluid from both ends of the cylinder and open them to exhaust. If, as is the customary operation of the set-works, the lever K is carried backward by the operator against the back-stop i till the arm I strikes the adjustable back-stop j' , the several parts of the mechanism will occupy positions indicated by dotted lines 4 on Fig. 6, the valve Q will remain in the position in which it is shown by full lines, and the piston M will be held down at the lower limit of its stroke by the fluid-pressure admitted to the upper end of the cylinder. A reversal of the movement of the lever K will produce a reversal of the operations above described. As in the other form of the apparatus first described, the movements of the arm I and the operation of the set-works produced by the motor are under the control of the lever K and will follow and correspond with the movements imparted by hand to said lever.

Various changes in minor details of construction and arrangement of parts other than those specifically shown and described may be made without departing from the principle and intended scope of my invention.

I claim—

1. In sawmill set-works the combination of a motor operatively connected with the setting mechanism, valve mechanism controlling the operation of the motor, and a lever also operatively connected with the setting mechanism and with said valve mechanism and adapted by its initial movement to start the motor and by its arrest to stop the motor, said lever being capable of a limited initial movement independently of the setting mechanism and adapted to operate said setting mechanism independently of the motor, substantially as and for the purposes set forth.

2. In sawmill set-works the combination of a shaft, a lever mounted thereon and capable of limited movement independently thereof, a motor operatively connected with said shaft, and valve mechanism controlling the operation of said motor and having connections with said lever and shaft whereby the initial movement of the lever in either direc-

tion will start the motor and its arrest will stop the motor, substantially as and for the purposes set forth.

3. In sawmill set-works the combination of
5 a shaft, a hand-lever mounted thereon and capable of limited movement independently thereof, a motor operatively connected with said shaft, a valve controlling the operation
10 of said motor, and a lever connected with said valve, hand-lever and shaft and adapted when operated by the initial movement of said hand-lever to open said valve and when
15 operated by said shaft, said hand-lever being at rest, to close said valve, substantially as and for the purposes set forth.

4. In sawmill set-works the combination of a shaft, a lever mounted upon said shaft and capable of limited movement independently thereof, stops, one of which is adjustable for
20 limiting the movement of said shaft, a motor operatively connected with said shaft, and a valve controlling the operation of said motor and so connected with said lever and shaft that the initial movement of the lever will
25 open the valve and the arrest of the lever will close the valve, substantially as and for the purposes set forth.

5. In sawmill set-works the combination of a shaft, a lever mounted thereon and capable
30 of limited movement independently thereof, a motor operatively connected with said shaft, a valve controlling the operation of said motor and so connected with said lever and shaft that the initial movement of the lever will
35 open the valve and the arrest of the lever will close the valve, and means for varying the independent movement of said lever with relation to said shaft, substantially as and for the purposes set forth.

40 6. In sawmill set-works the combination of a rock-shaft, an arm fixed thereon, a lever loosely mounted on said shaft, stops arranged to limit the independent movement of said arm and lever with relation to each other,
45 stops, one of which is adjustable for limiting the movement of said arm, a motor operatively connected with said shaft and a valve controlling the operation of said motor and connected with said shaft and lever so that
50 the initial movement of the lever will open said valve and the arrest of said lever will close said valve, substantially as and for the purposes set forth.

7. In sawmill set-works the combination of
55 a rock-shaft, a motor operatively connected therewith, a hand-lever mounted on said shaft and capable of limited movement independently thereof, a valve controlling the operation of said motor, and a lever pivotally con-
60 nected with said shaft, hand-lever and valve, the connection of said lever with said valve surrounding said shaft, substantially as and for the purposes set forth.

8. In sawmill set-works the combination of
65 a rock-shaft, a motor operatively connected therewith, a valve controlling the operation

of said motor, a hand-lever mounted upon said shaft and capable of limited independent movement, a lever pivotally connected with
70 said hand-lever and shaft and formed with an opening through which said shaft passes, of sufficient size to allow said lever to swing a limited distance on its pivot connection with said shaft, and a rod pivoted to said le-
75 ver around the opening therein and connecting it with said valve, substantially as and for the purposes set forth.

9. In sawmill set-works the combination of a rock-shaft, a motor operatively connected with said shaft, a valve controlling the opera-
80 tion of said motor, a hand-lever mounted on said shaft and capable of limited movement independently thereof, a lever made of two parts with circular openings through them and pivotally connected with said hand-lever
85 and rock-shaft, and a rod connected with said valve and provided with a head which is formed with an opening for the passage through it of, and larger than, said shaft, and on opposite sides around said opening with
90 circular bearings fitted to turn in the openings in said lever parts which are bolted together upon said head, substantially as and for the purposes set forth.

10. In sawmill set-works the combination
95 of a rock-shaft provided with a gear and an arm which are fixed thereon, stops one of which is adjustable for limiting the movement of said arm and rock-shaft, a hand-lever mounted on said shaft and capable of
100 limited movement independently thereof, a cylinder having fluid supply and exhaust connections, a valve controlling said fluid connections, a piston fitted in said cylinder and connected with a rack engaging said
105 gear, and a lever connected with said rock-shaft, hand-lever and valve so that the initial movement of the hand-lever in either direction will open the valve and its arrest at any point will cause the valve to be closed,
110 substantially as and for the purposes set forth.

11. In sawmill set-works the combination with the set-shaft and a rock-shaft having an operating connection with said set-shaft, of a
115 motor operatively connected with said rock-shaft, a valve controlling the operation of said motor, a hand-lever mounted on and capable of limited movement independently of said rock-shaft, and connections between said
120 valve, hand-lever and rock-shaft whereby the initial movement of said lever in either direction from a central position with reference to its independent movement will open said valve and the arrest of said lever at any
125 point will cause said valve to be closed, substantially as and for the purposes set forth.

12. In sawmill set-works the combination of a rock-shaft having an arm fixed thereon,
130 and a lever movable relatively to said arm, one being provided with opposing stops and the other with a tapered slide for taking up

more or less of the independent movement of said lever, a motor operatively connected with said shaft, and valve mechanism controlling the operation of said motor and connected with said lever and with said shaft so that the initial movement of the lever in either direction will start the motor and the continued movement of said shaft when said lever is arrested will stop the motor, substantially as and for the purposes set forth.

13. In a setting mechanism for sawmill-carriages, the combination with a set-lever, of means controlled by the movement thereof and having suitable connections with the set-works to automatically operate the same, and means also connected with said set-works and normally moving in both directions in advance of said lever and in the path of the same whereby said set-works will be manually operated should said automatically-oper-

ating means become inoperative, substantially as described.

14. The combination, with a set-lever, of means controlled by the movement thereof and having suitable connections with the set-works to automatically operate the same, and an oscillating set-works lever normally moved by said means in both directions in advance of said set-lever and in the path of the same, whereby said set-works will be manually operated should said automatically-operating means become inoperative, substantially as described.

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

ALBERT CUNNINGHAM.

Witnesses:

CHAS. L. GOSS,
E. V. WRIGHT.