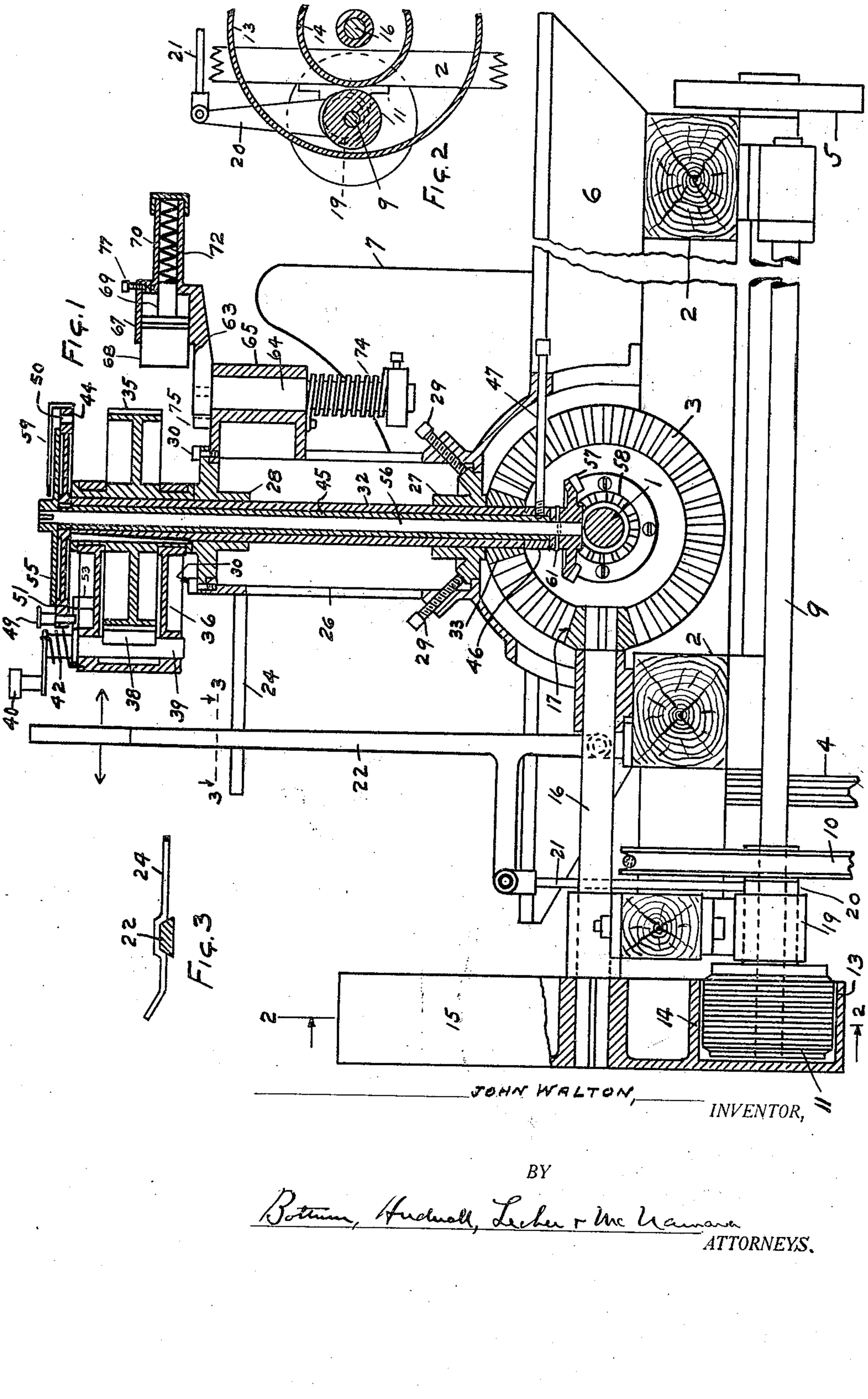
Jan. 2, 1923

J. WALTON.
POWER SETWORKS.
FILED SEPT. 28, 1921.

1,440,650

3 SHEETS-SHEET 1



BY

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3 SHEETS-SHEET 2

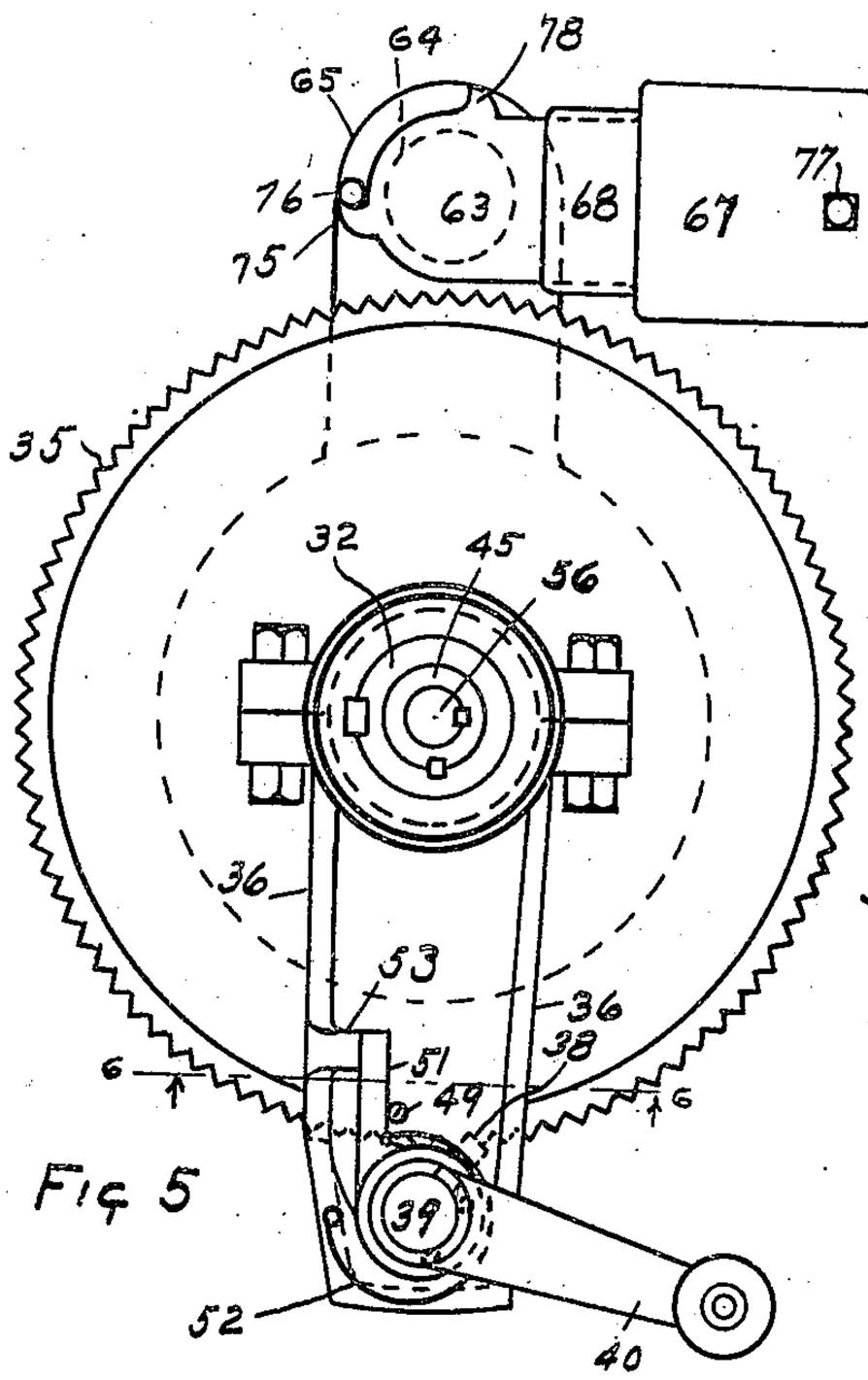

FIG 5

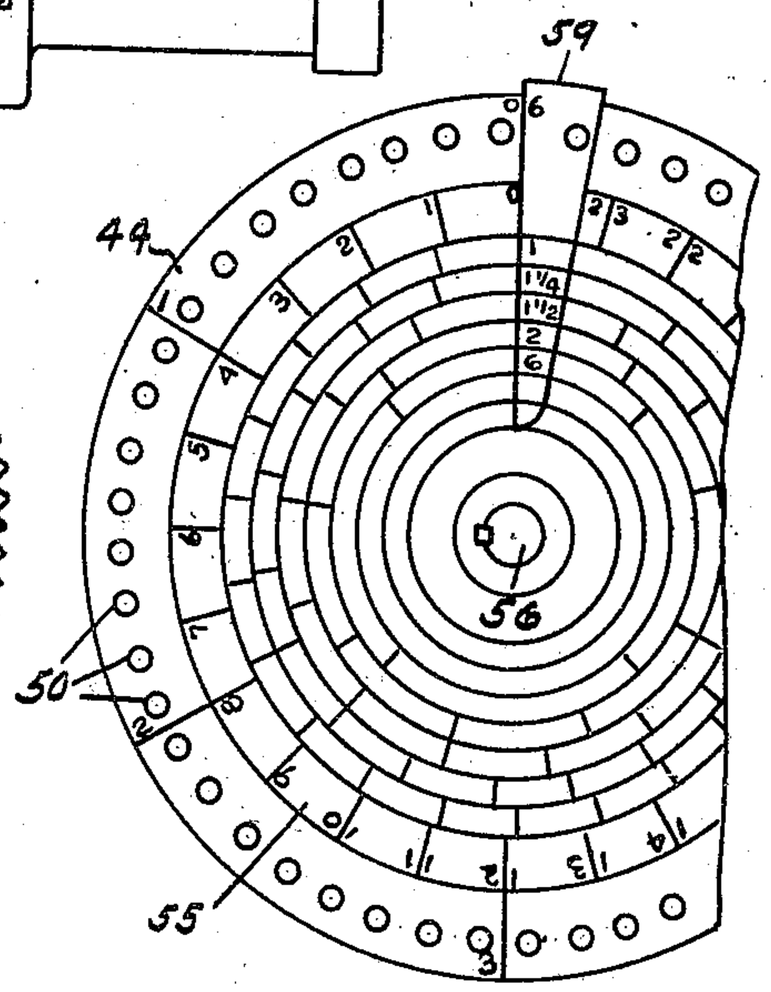

FIG 4

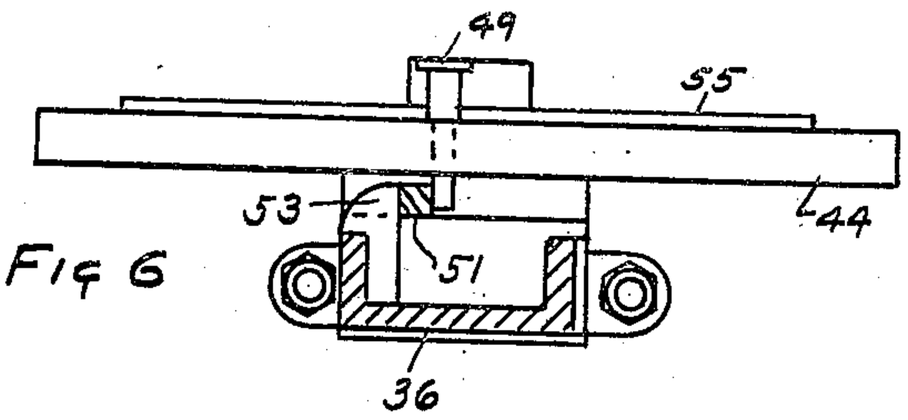

FIG 6

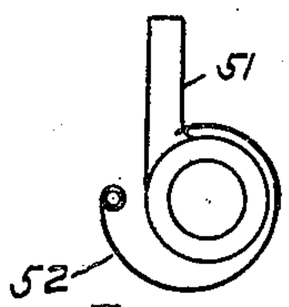

FIG 7

JOHN WALTON, INVENTOR,

BY

Bottum, Hudnall, Lucken & McNamara
ATTORNEYS.

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3 SHEETS-SHEET 3

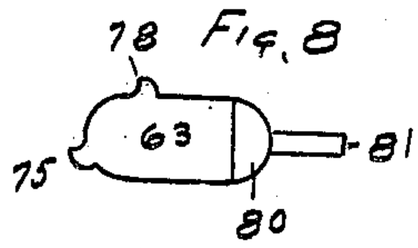

Fig. 8

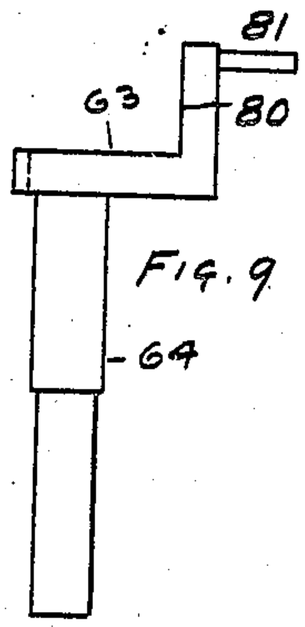

Fig. 9

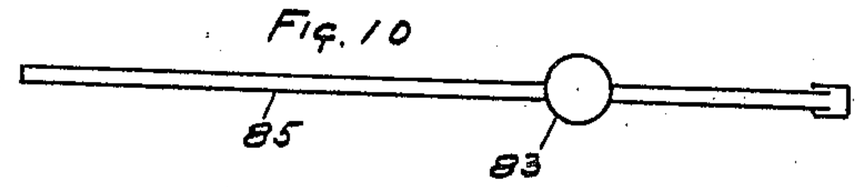

Fig. 10

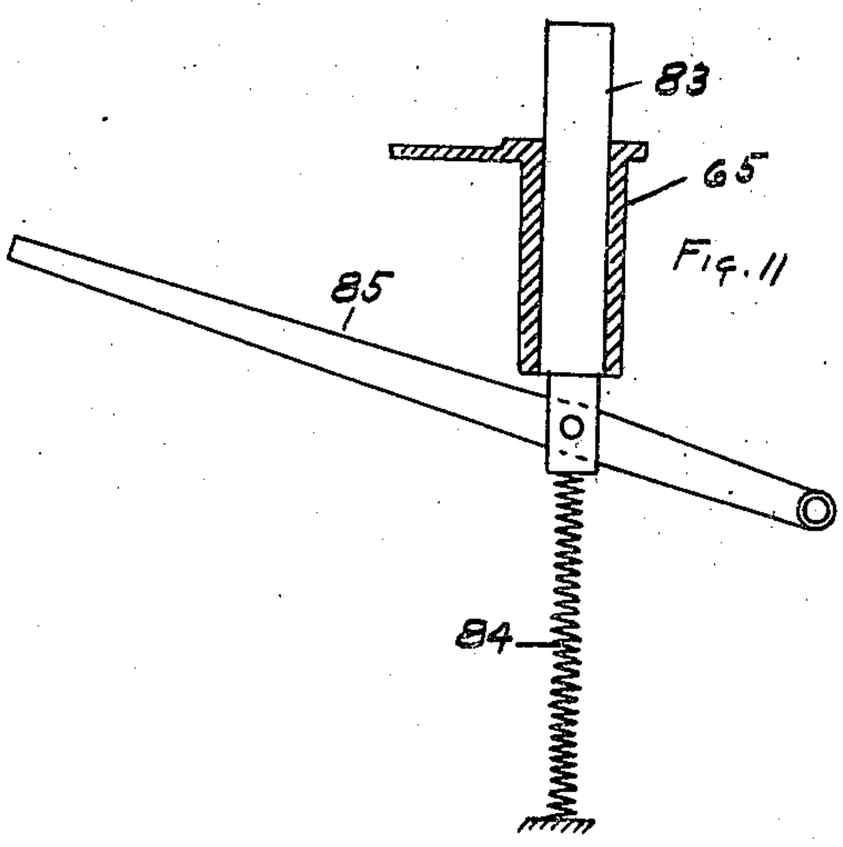

Fig. 11

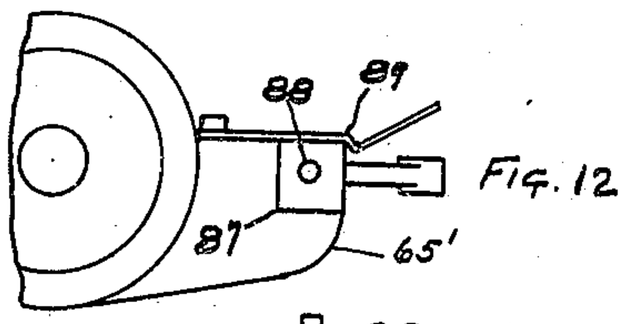

Fig. 12

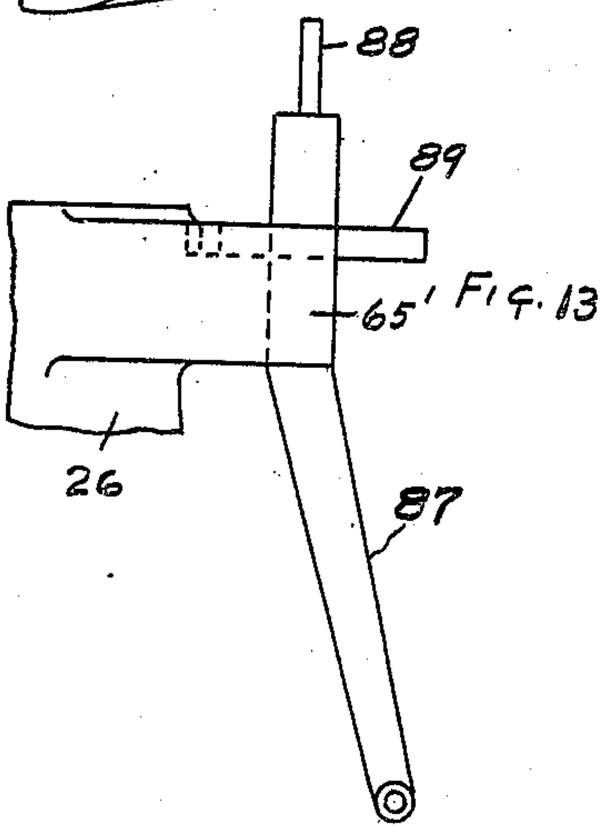

Fig. 13

INVENTOR,
JOHN WALTON,

BY

Bottum, Hudnall, Locher & Mc Namara

ATTORNEYS.

Patented Jan. 2, 1923. 1,440,650

UNITED STATES PATENT OFFICE.

JOHN WALTON, OF MILWAUKEE, WISCONSIN.

POWER SETWORKS.

Application filed September 28, 1921. Serial No. 503,829.

To all whom it may concern:

Be it known that I, JOHN WALTON, 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 Power Setworks, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates to power set works in which a home stop cooperates with a setting arm and ratchet wheel to arrest the advance of the knees at predetermined points independently of the power connection with the set shaft.

Its main objects are with a ratchet wheel of practicable size for setting at one revolution thereof for lumber within certain dimensions, say from one to six inches, to provide for setting for larger dimensions, say over six inches, requiring more than one revolution of the ratchet wheel, by a continuous movement of the set shaft and knees, and generally to simplify and improve the construction and operation of set works of this class.

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

In the accompanying drawing like characters designate the same parts in the several figures.

Figure 1 is a vertical section of set works embodying the invention as applied to a sawmill carriage, which is shown in cross section; Fig. 2 is a reduced vertical section on the line 2—2, Fig. 1, of a power driving connection for advancing and receding the knees; Fig. 3 is an enlarged horizontal section on the line 3—3, Fig. 1, of the hand-operating lever, showing a spring clip for holding it in central position; Fig. 4 is a plan view on an enlarged scale of the stationary gage plate or ring and the rotary lumber scale dial; Fig. 5 is a plan view of the ratchet wheel, setting arm and home stop, with the gage plate and dial removed; Fig. 6 is a side elevation of the gage plate and dial and a cross section on the line 6—6, Fig. 5, of the setting arm; Fig. 7 is a plan view of a contact or abutment member pivotally mounted on the setting arm to cooperate with a gage stop on the gage plate; Figs. 8 and 9 are a plan view and side elevation respectively, of a modified form of home stop; Figs. 10 and 11 are like views of another modification of the home stop; and Figs. 12 and 13 are like views of still another modification of the home stop.

Referring to Fig. 1, 1 designates a set shaft mounted in the usual manner lengthwise on a carriage frame 2, and provided with a bevel gear 3.

The carriage is provided with truck wheels 4 and 5, head blocks 6 and knees 7, of the usual or any suitable construction.

For the operation of the set works by power, a driving shaft 9 is mounted in bearings on the under side of the carriage frame below and transversely to the set shaft, and provided with a rope or cable sheave 10, and with a paper or driving friction wheel 11.

The driving friction wheel 11 is arranged to cooperate with concentric cylindrical rims 13 and 14 of a metal friction wheel 15, which is mounted on the rear end of a shaft 16 above and parallel with the shaft 9 and provided at its front end with a bevel pinion 17, meshing with the gear 3.

As shown in Figs. 1 and 2, the driving shaft 9 adjacent the friction wheel 11, is mounted in an eccentric bearing 19, provided with an arm 20, which is connected by a rod 21 with a lateral arm of a hand operated lever 22. The driving friction wheel 11 is movable by the lever 22 from a middle neutral position into engagement with the rim 13 or the rim 14 of the driven friction wheel, for advancing or receding the knees 7. The lever 22, as shown in Figs. 1 and 3, is held normally by engagement with a seat or depression in a spring clip or support 24 in a central or neutral position with the driving friction wheel 11, which is constantly rotated when the carriage is in use, out of contact with both rims 13 and 14.

A hollow stand or column 26, is mounted on the carriage frame 2, over the bevel gear 3 on the set shaft, and is provided in the upper and lower parts thereof with removable aligned bearings 27 and 28, which are fastened in place in the column by bolts or screws 29 and 30.

A tubular shaft 32, mounted in said bearings, is provided at its lower end with a bevel pinion 33, meshing with the gear 3. A ratchet wheel 35, is keyed or fixed on said shaft above the column, and a pawl carrier or setting arm 36 is journaled on the hub of the ratchet wheel coaxially therewith. The setting arm 36 is provided with one or

more pawls 38, pivotally mounted therein adjacent the toothed rim of the ratchet wheel, by a pin 39, which is provided at its upper end with a crank handle 40, for manually throwing the pawl out of engagement with the ratchet wheel and turning the setting arm on the ratchet wheel. A spring 42, tends to hold the pawl in engagement with the teeth of the ratchet wheel.

An annular or circular gage plate 44, is keyed or fixed to the upper end of a tubular post 45, extending downwardly through the tubular shaft 32 and provided at its lower end with a collar 46, which is releasably fastened by a bolt 47 to the base of the column, to hold the gage plate from turning.

As shown in Figs. 1, 4 and 6, the gage plate 44 is provided with one or more pins or gage stops 49, removably fitting any of a circular series of holes 50, shown in Fig. 4, corresponding in number and arrangement with the teeth of the ratchet wheel.

An abutment or contact member 51, pivotally connected by the pawl pivot pin 39 with the setting arm 36, is yieldingly held by a spring 52 against a shoulder 53 on the setting arm, as shown in Figs. 1, 5, 6 and 7.

Directly over the gage plate 44, a dial 55 is mounted on the upper end of a shaft 56, passing downwardly through the tubular post 45 and provided at its lower end with a bevel gear 57, which meshes with a similar gear 58 mounted on the set shaft 1, or attached concentrically therewith to the gear 3.

The dial is provided as usual, with a number of concentric scales for sawing lumber of different dimensions, the width of the saw kerf being taken into account in these scales, except in the outer scale, which shows the distance of the knees from the saw plane, indicated by a stationary index or pointer 59, fastened to the gage plate 44 and extending upwardly therefrom and inwardly over the dial, as shown in Figs. 1 and 4.

The gear 57 is detachably fastened, as by a pin 61, to the shaft 56, so that by removing the pin and the bolts or screws 29, 30 and 47, the ratchet wheel 35, setting arm 36, gage plate 44 and dial 55, with the shafts 32 and 56, post 45 and bearings 27 and 28, may be withdrawn bodily upward from the stand or column 26.

The set works is provided with a home stop for exactly limiting the advance movement of the knees by the setting mechanism at different points, determined by the adjustment of the gage stop 49 on the gage plate 44, which in turn determines the starting point of the setting arm 36 for setting lumber of any given dimension. This home stop is movable into and out of operative position in the path of the setting arm 36 to permit more than one revolution of the ratchet wheel at a time, for sawing lumber of any dimension exceeding the limits of a single revolution of the ratchet wheel and setting arm.

As shown in Figs. 1 and 5, the home stop comprises an arm 63, fixed on the upper end of a vertical shaft 64, rotatably mounted in an extension 65 of the stand or column 26. The arm 63 is provided on the upper side with a cylinder 67, disposed radially relative to the shaft 64, and open at its inner end. The cylinder is provided with a plunger 68, having a stem 69 working in a tubular extension 70 of the cylinder at its outer end. A spring 72, enclosed in the cylinder extension 70 and bearing at its inner end against the stem 69, holds the plunger normally projecting from the inner open end of the cylinder, as shown in Fig. 1. The cylinder and plunger constitute an air cushion for checking the final advance movement of the setting arm 36 and preventing recoil and shock or jar in the operation of the setting mechanism when the setting arm is brought to its final position against the home stop.

The shaft 64 on which the home stop swings, is extended below its bearing in the column extension 65, and is provided with a spring 74, which tends to swing the arm 63 inwardly and to carry the plunger 68 into and hold it in the path of the setting arm 36 with a stop lug 75 on the hub of the arm in engagement with a stop pin or lug 76 on the extension 65, as shown in Fig. 5.

The air cushion formed by the cylinder 67 and plunger 68, is regulated as desired, by a screw or adjustable valve 77, controlling a vent passage in the closed end of the cylinder.

The cylinder extension 70 serves as a handle for turning the home stop outwardly into inoperative position, as shown in Fig. 1, its movement in this direction being limited by the engagement of a stop lug 78 on the hub of the arm 63 with the stop pin or lug 76.

Referring to Figs. 8 and 9, in place of the air cushion cylinder and plunger shown in Figs. 1 and 5, the arm 63 of the home stop may be provided with an upwardly projecting abutment 80, having a handle 81 and movable into and out of operative position in the path of the setting arm.

Referring to Figs. 10 and 11, the home stop may consist simply of a post 83, which may be fitted to slide up and down in the column extension 65 into and out of operative position in the path of the setting arm 36. A compression spring 84, interposed between the lower end of the post and a stationary support below it, tends to thrust the post upwardly and hold it in operative position. It is moved downwardly out of operative position by a hand lever 85.

Referring to Figs. 12 and 13, the home

stop may consist of an arm or post 87, provided at its upper end with a handle 88, and pivoted at its lower end to the column 26 or other convenient stationary support, so as to be swung into and out of operative position in engagement with a shoulder or seat formed in an extension 65′ on the column 26. A spring detent 89, yieldingly holds the arm or post 87 in operative position.

In the operation of the set works, the knees are advanced by swinging the hand lever 22 forward, thereby carrying the constantly rotated driving friction wheel 11 into engagement with the rim 13 of the driven wheel 15, and the knees are receded by pulling the lever 22 backward, thereby carrying the driving wheel 11 into engagement with the rim 14 of the driven wheel. In its middle and neutral position, as shown in Fig. 1, the driving wheel 11 is out of engagement with both rims 13 and 14 of the driven wheel 15, and has no effect on the setting mechanism.

With both the advance and receding movements of the knees the ratchet wheel 35 and the dial 55 are turned in corresponding directions by their connections hereinbefore described, with the set shaft 1, the movement of the knees in setting and receding being effected by a direct connection through the shaft 16 and friction wheels with the driving shaft 9, independently of the operation of the ratchet wheel 35, setting arm 36 and dial 55, which simply determine the extent of the advance movement of the knees for cutting lumber of different dimensions.

For cutting lumber of any dimension within the limits of a single revolution of the ratchet wheel 35 and setting arm 36, say from one to six inches, the setting mechanism operates in a manner similar to that of power set works of this type. If, for example, an inch board is to be sawed from a twelve inch piece of timber which is set up with the knees to the saw plane, as indicated on the outer scale of the dial 55, the gage pin or stop 49 is placed in the hole 50 of the gage plate 44, corresponding with that dimension. The setting arm 36 is then swung backward with the handle 40 by which the pawl 38 is turned, and held out of engagement with the teeth of the ratchet wheel, till the abutment or contact member 51 on the setting arm, engages the gage pin or stop 49, as shown in Figs. 5 and 6. The handle 40 being released, allows the pawl 38 to be thrown by the spring 42 into engagement with the ratchet wheel, locking the setting arm thereto in its initial position for setting. The setter then throws the lever 22 forward, carrying the driving friction into engagement with the rim 13 of the driven friction, which thereupon through the connections hereinbefore described, moves the knees 7 forward on the head blocks 6 till the setting arm 36 is brought into engagement with the home stop, and the advance movement of the knees controlled thereby is arrested at the exact limit of one inch, such movement being checked as it approaches its limit by the air cushion, in case the form of stop shown in Figs. 1 and 5 is employed, thereby preventing any recoil of the setting arm and shock to the setting mechanism. The setter thereupon throws the lever 22 back to its middle position, thereby disconnecting the setting mechanism from the power driving shaft or member.

In setting for lumber of any dimension exceeding the limit of a single revolution of the ratchet wheel 35 and setting arm 36, at the end of a complete revolution of the setting arm from its initial position, the abutment or contact member 51 striking the opposite side of the gage pin or stop 49, yields backward against the tension of the spring 52 till it passes the gage pin or stop, whereupon it is instantly returned to its normal position against the shoulder 53, by said spring. This avoids the necessity of care and attention on the part of the setter to withdraw the gage pin or stop in order to permit the setting arm to make more than one complete revolution, and in case he neglects to do so, prevents breaking or injuring the setting mechanism.

In case a piece of lumber is to be cut of a dimension above the limit of a single revolution of the ratchet wheel 35, say a piece eight inches thick, a single revolution of the ratchet wheel representing six inches, the gage pin or stop 49 is placed in a hole 50 corresponding with two inches, the setting arm 36 is turned back as before against the gage pin or stop, the home stop is swung out of operative position with the stop lug 78 against the stop pin or lug 76, and power is applied to the set works as before. As soon as the setting arm passes the home stop the home stop is released and returned by the spring 74 to operative position in the path of said arm, the setting arm continuing to turn with the ratchet wheel till it has completed a full revolution after passing the home stop, whereupon it is brought into engagement with the home stop and its further advance arrested as before. The knees are thus advanced by continuous operation, a distance represented by one complete revolution of the ratchet wheel and setting arm, plus the fraction of a revolution represented by the adjustment of the gage pin or stop 49, as above explained.

For cutting a piece of lumber of a still greater dimension, requiring two or more revolutions of the ratchet wheel and setting arm, the procedure is the same, except that

the home stop is held by the setter out of operative position till the setting arm passes it two or more times.

The operation of the set works with the home stops illustrated in Figs. 8 and 9, 10 and 11 or 12 and 13, is exactly the same as that hereinbefore described in connection with the cushion stop, except that the movement of the setting arm and ratchet wheel is instantly and abruptly arrested without the check afforded by the form of stop shown in Figs. 1 and 5.

Various changes in the details of construction and arrangement of parts of the mechanism other than those described, may be made, without departure from the principle and scope of the invention as defined in the following claims.

I claim:

1. In power set works the combination of a set shaft, a power connection with the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm coaxial with the ratchet wheel, means for locking the setting arm to the ratchet wheel in predetermined angular relation thereto, and a home stop movable into and out of the path of the setting arm.

2. In power set works the combination of a set shaft, a power connection with the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm co-axial with the ratchet wheel, means for locking the setting arm to the ratchet wheel in predetermined angular relation thereto, a home stop movable into and out of the path of the setting arm, and means tending to shift said stop into and retain it in the path of said arm.

3. In power set works the combination of a set shaft, a power connection with the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm coaxial with the ratchet wheel, means for locking the setting arm to the ratchet wheel in predetermined angular relation thereto, and a home stop movable into and out of the path of the setting arm and comprising a yielding contact member adapted to check the final advance movement of said arm as it comes to rest.

4. In power set works the combination of a set shaft, a power connection with the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm coaxial with the ratchet wheel, means for locking the setting arm to the ratchet wheel in predetermined angular relation thereto, and a home stop movable into and out of the path of the setting arm and comprising a yielding contact member adapted to oppose increasing resistance to the advance of the said arm as it approaches its final position.

5. In power set works the combination of a set shaft, a power connection with the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm coaxial with the ratchet wheel, means for locking the setting arm to the ratchet wheel in predetermined angular relation thereto, a home stop movable into and out of the path of the setting arm and comprising a yielding member opposing in its operative position increasing resistance to the advance movement of said arm as it approaches its final position, and means tending to shift said stop into operative position.

6. In power set works the combination of a set shaft, a power connection for actuating the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm rotatably mounted coaxially with the ratchet wheel, means for releasably engaging the setting arm with the ratchet wheel, a stationary gage plate coaxial with the ratchet wheel and setting arm, a gage stop adjustable on the gage plate for determining the initial position of the setting arm, a contact member mounted on the setting arm and movable into and out of operative position to be arrested by the gage stop in one direction and permitted to pass it in the other direction, and a home stop movable into and out of the path of the setting arm.

7. In power set works the combination of a set shaft, a power connection for actuating the set shaft, a ratchet wheel having a constant actuating connection with the set shaft, a setting arm rotatably mounted coaxially with the ratchet wheel, a stationary gage plate coaxial with the ratchet wheel and setting arm, a gage stop adjustable on the gage plate for determining the initial position of the setting arm, a contact member mounted on the setting arm and movable into and out of operative position to be arrested by the gage stop in one direction and permitted to pass it in the other direction, means tending to shift the contact member into and to hold it in operative position, and a home stop movable into and out of the path of the setting arm.

8. In a power set works the combination with a set shaft, a hollow supporting column located over the set shaft, bearings removably mounted in the upper and lower parts of the column, a tubular shaft mounted in said bearings and geared with the set shaft, a ratchet wheel fixed on said shaft above the column, and a rotary setting arm, a stationary gage plate and a rotary lumber scale dial mounted coaxially with the ratchet wheel on the column, and removable therewith and with said tubular shaft and bearings bodily from the column.

In witness whereof I hereto affix my signature.

JOHN WALTON.