(No Model.) 4 Sheets—Sheet 1.

A. MILLS.

CIRCULAR STONE SAW.

No. 555,611. Patented Mar. 3, 1896.

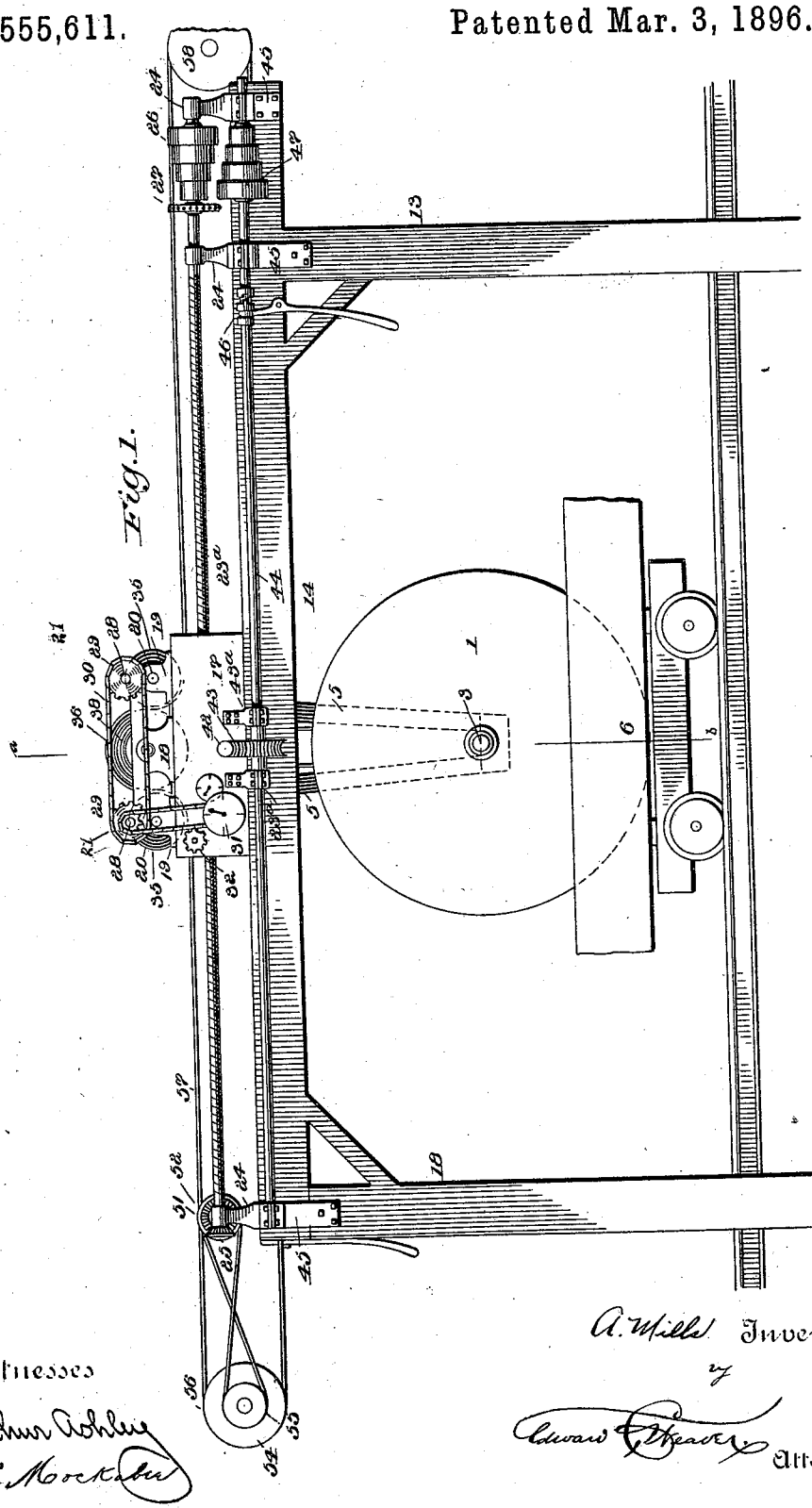

Fig. 1.

Witnesses
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A. MILLS.

CIRCULAR STONE SAW.

No. 555,611. Patented Mar. 3, 1896.

Fig. 2.

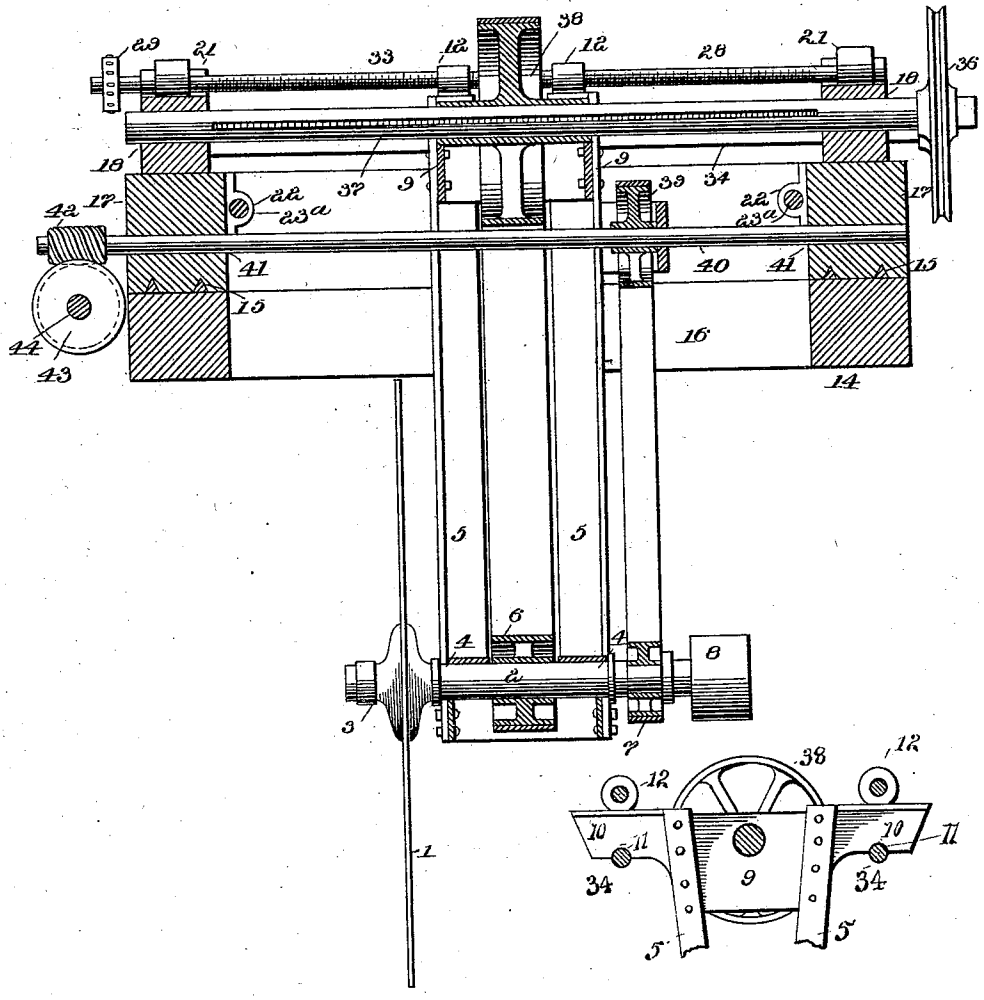

Fig. 6.

WITNESSES

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(No Model.) 4 Sheets—Sheet 3.

A. MILLS.

CIRCULAR STONE SAW.

No. 555,611. Patented Mar. 3, 1896.

Fig. 3.

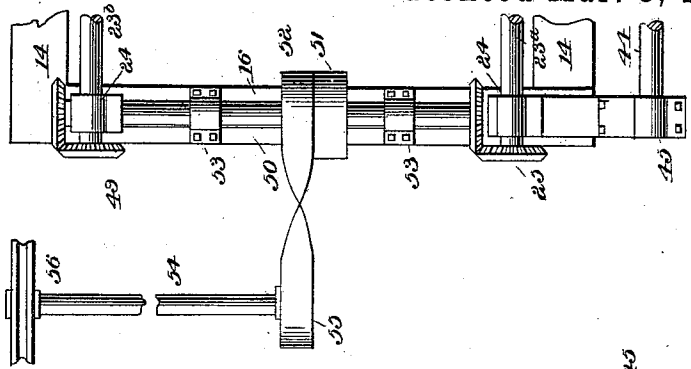

Fig. 4.

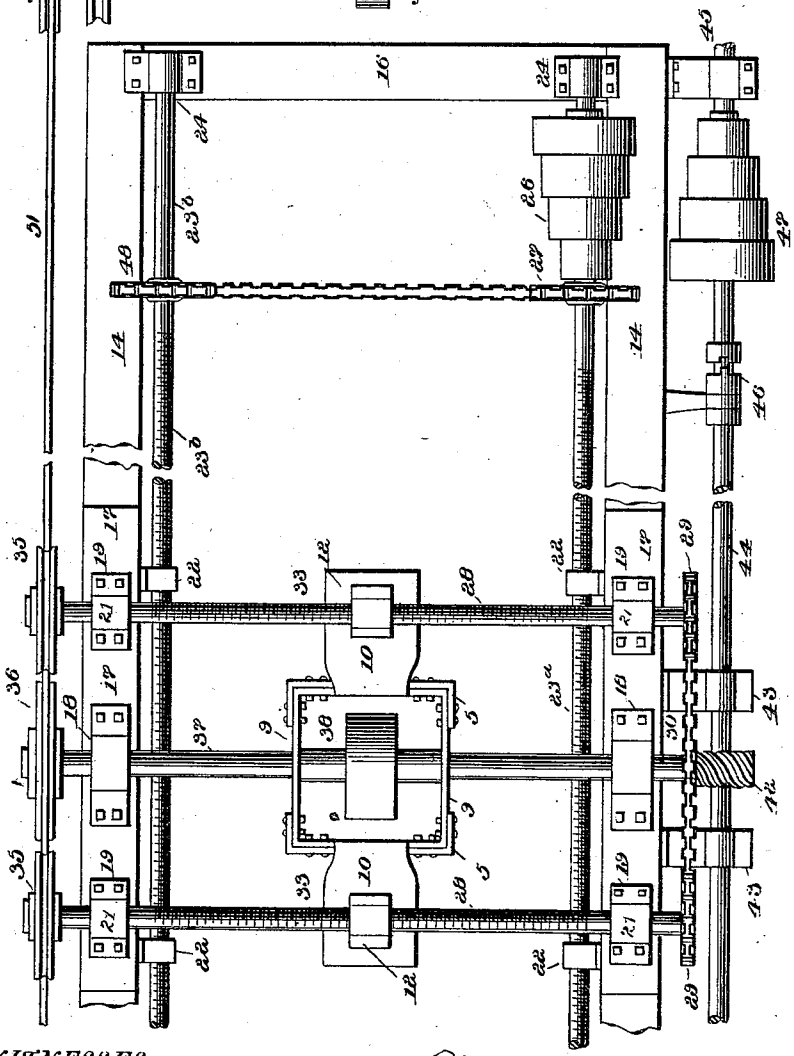

Fig. 3.

WITNESSES

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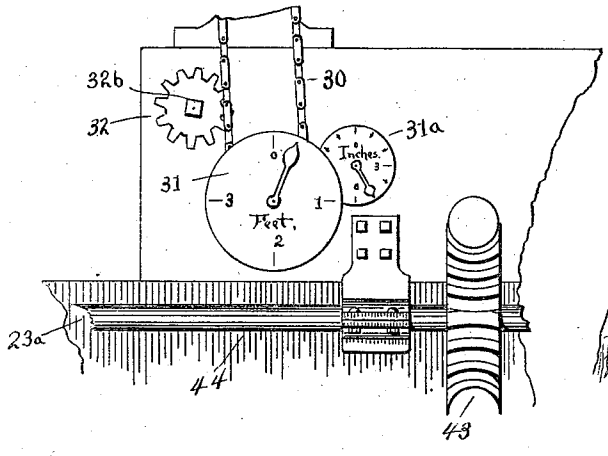
(No Model.) 4 Sheets—Sheet 4.

A. MILLS.

CIRCULAR STONE SAW.

No. 555,611. Patented Mar. 3, 1896.

Fig 7



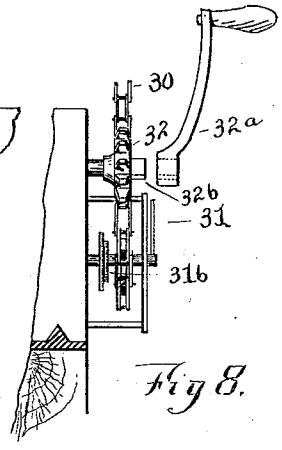


Fig 8.

Witnesses
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A. Mills, Inventor
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UNITED STATES PATENT OFFICE.

ANDREW MILLS, OF NEW YORK, N. Y.

CIRCULAR STONE-SAW.

SPECIFICATION forming part of Letters Patent No. 555,611, dated March 3, 1896.

Application filed May 6, 1895. Serial No. 548,339. (No model.)

To all whom it may concern:

Be it known that I, ANDREW MILLS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Circular Stone-Saws, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to rotary or circular saws for the cutting of stone, more particularly for use in the yard or mill where the dressing and shaping take place.

While I am aware that there are certain inventions relating to the use of circular saws in sawing stone, it is my belief that these are incomplete and unwieldy in their operation. It is my desire to reduce to a simple and practical art the operation of such circular saws and the manipulation of the same.

Briefly, my invention is carried out by supporting the circular saw, preferably a diamond saw, upon a laterally-moving depending frame mounted upon a carriage having longitudinal progressive motion, which motion is positively controlled by the operator. The details hereinafter given will carefully show how this result is brought about.

In the accompanying drawings, which are to aid my description, Figure 1 represents an elevation of my complete machine as seen from the front. Fig. 2 is a section of the same upon the line *a b*, Fig. 1. Figs. 3, 4, and 5 represent top views of portions of the machine. Fig. 6 is a detail of part of the before-mentioned depending frame, and Figs. 7 and 8 are details of a portion of Fig. 1.

In all of the views the same numeral indicates the same part.

1 is a circular saw, preferably a diamond saw, mounted upon a mandrel 2, to which it is secured by nut-plate 3. The said mandrel 2 is retained in bearings 4 of the depending frame 5, which is constructed of angle-iron. Said mandrel also is provided with power-pulley 6 within the frame 5, a driving-pulley 7, and a counterweight-wheel 8, and, if desired, may be made hollow for the purpose of feeding water to the saw, this being a well-known feature and not needing special mention.

The hanging frame 5 is provided at its upper end with plates 9 and extensions 10, which have grooves 11 upon the under face and threaded hollow lugs 12 upon the top, the use of which will be hereinafter made plain.

A wooden structure 13 has parallel top beams 14, upon which are track-irons 15, said beams 14 being connected at their ends by cross-beams 16.

Upon the track-irons 15 is placed a carriage comprising plates 17, having centrally-located pedestal-bearings 18 and pedestals 19 disposed near the ends of the said plates. The pedestals 19 contain lower bearings, 20, and upper bearings, 21. Upon the inner face of the said plates 17 are placed hollow lugs 22, threaded to engage long feed-screws 23^a and 23^b parallel with the beams 14 and mounted in pedestal-bearings 24. The screw 23^a has at one end the bevel gear-wheel 25 and at the other end a cone-pulley 26, backed with sprocket-wheel 27.

Mounted in the bearings 21 are shafts 28, provided at their forward ends with sprocket-wheels 29, coupled by chain 30, and also coupled by chain or otherwise to an indicator 31 and to a key 32 or other device for turning the said sprocket-wheels for the purpose hereinafter described. The shafts 28 have centrally-located threaded portions 33, engaging the before-described lugs 12 of hanging frame 5, which is in a measure supported at grooves 11 upon the shafts 34, retained in the bearings 20 and provided at their rear ends with grooved pulleys 35. Parallel to these grooved pulleys is a similar grooved pulley, 36, carried upon the slotted shaft 37, rotating in the bearings 18. Upon this slotted shaft 17 is placed a feathered wheel 38, secured in the frame 5 and moving laterally therewith that it may be disposed oppositely to pulley 6. Opposite the pulley 7 is disposed another feathered pulley 39, mounted upon slotted shaft 40, retained in bearings 41 of plates 17. Upon the front end of said shaft 40 is a worm 42, engaging a worm gear-wheel 43, mounted in brackets 43^a and moving therewith. Said gear-wheel 43 is feathered to slotted shaft 44 and gives motion to the same, said shaft being mounted upon brackets 45 and having gear-clutch 46 and cone-pulley 47, disposed opposite cone-pulley 26 before mentioned.

The sprocket-wheel 27 back of the cone-

pulley 26 engages by chain a similar sprocket-wheel, 48, mounted upon the worm-screw 23^b, and the same screw carries a bevel-gear 49 at the other end. These gears 25 and 49 engage companion gears mounted upon a shaft 50, mounted in pedestal-bearings 53 and having fixed and loose pulleys 51 and 52, respectively. Power is taken from a line-shaft 54, having a belt-pulley 55 and a cable-pulley 56. The cable 57 runs over the pulley 56, around grooved pulleys 35, 36, and 35 to an idler-pulley 58, which may have slack-adjusting mechanism, which it is not deemed necessary to show.

Having described the mechanism, the operation of the invention is as follows: Power is obtained from the line-shaft 54 through the cable 57 into pulley 36 and shaft 37 and wheel 38, from which a belt (not shown) transmits motion to the saw-mandrel through pulley 6. Another belt (not shown) from pulley 7 to pulley 39 rotates shaft 40, worm 42, worm-wheel 43, shaft 44, cone 47, from which a belt (not shown) transmits motion to the cone 26 and the worm-screw 23^a. The sprocket-wheels 27 and 48 by chain transmit the like motion to the worm-shaft 23^b. This operates to slide the carriage in the direction of the feed of the saw. Reverse motion of the said carriage is secured by throwing out of engagement the clutch 46 and throwing belt from the loose pulley 52 to fast pulley 51. This causes shaft 50 to rotate and the bevel-gears 25 and 49 to rotate the worm-shafts 23^a and 23^b in a reverse direction. The depending frame 5 is given lateral adjustment upon the carriage by moving key device 32, by which motion is transmitted through sprocket-wheels 29, coupled by chain 30, shafts 28, and the threaded portion 33 thereof. The said threaded portion, by its engagement with the lugs 12 of the said frame 5, controls the movement of the same. The use of an indicator upon the face of the carriage permits the operator to judge the amount of lateral travel given the saw without measuring the same. It is obvious that this indicator measurement may by the proper combination of worm-screws of known diameter and pitch, and of sprocket-wheels of known diameter and number of teeth, be reduced to feet, inches and parts of inches, a desirable feature in the sawing of dimension stone. The stone is placed upon a car, and for convenience placed under the saw upon rails. After being once in place there is no necessity for its being moved, as the saw is itself adjusted.

It is desired to particularly call attention to the fact that the feeding of the saw into the stone to be cut is consummated by the transmission of power from the saw-mandrel to the sliding carriage carrying the said saw, and this method of operation results in an instant stoppage of the feed in case the saw is stopped, and, moreover, the speed of the feed is dependent upon the speed rotation of the saw. This is deemed an important feature in view of the accidents common in the crowding of circular saws. It is to be further noted that an up cut is desirable in the saw, as it tends both to retain the saw in the material to be cut and retains the water sluiced into the curf instead of throwing the same out.

By glancing at Figs. 7 and 8 it will be readily understood that by means of the key 32^a and the square lug 32^b the sprocket-wheel 32 engaging the chain 30 is rotated, at once giving transverse travel to the depending frame bearing the saw, and by means of the indicators 31 and 31^a and their connecting-train of gear-wheels 31^b showing upon the said indicator-dials the exact amount of travel of the depending frame. This device is deemed, however, too well known to mechanics to need more definite description.

Having described my invention and shown its operation, (and while I do not desire to confine myself to the exact apparatus shown,) I will make my claims to Letters Patent as follows:

1. A stone-sawing machine, comprising an elevated trackway, a sliding carriage mounted thereon, a laterally-adjustable depending frame supported by said carriage and having journaled at its lower extremity a circular saw, worm-shafts journaled in the sides of the said sliding carriage and engaging threaded openings in the before-described depending frame, a mechanism for operating the said worm-shafts, worm-shafts journaled at the ends of the trackway and engaging threaded openings in the sliding carriage, a slotted main shaft journaled in the sides of the sliding carriage with a feathered pulley mounted thereon and fixed within the depending frame and transmitting motion by belt to the circular-saw mandrel, a pulley upon said mandrel belted to a feathered pulley mounted upon a slotted shaft journaled likewise in the sides of the sliding carriage, an endless screw or worm upon the extremity of the said slotted shaft at the front of the sliding carriage, a worm gear-wheel engaging said worm, and journaled to the sliding carriage and feathered to a slotted shaft journaled parallel to the trackway, a cone-pulley mounted upon said slotted shaft and belted to another cone-pulley mounted upon the worm-shaft before described as moving the sliding carriage, combined with mechanism for actuating slotted main shaft mounted in the sliding carriage, substantially as described.

2. A stone-sawing machine, comprising an elevated trackway, a sliding carriage mounted thereon, a laterally-adjustable depending frame supported by said carriage and having journaled at its lower extremity a circular saw whose cutting path is parallel to the path of the sliding carriage, worm-shafts journaled in the sides of the said sliding carriage and engaging threaded openings in the before-described depending frame and adjusting the position thereof, a mechanism for operating the said worm-shafts and synchronously op-

erating a measuring-indicator showing the amount of travel of the said depending frame, worm-shafts journaled at the ends of the trackway and engaging threaded openings in the sliding carriage and operating to move the same, a slotted main shaft journaled in the sides of the sliding carriage with a feathered pulley mounted thereon and fixed within the depending frame and transmitting motion by belt to the circular-saw mandrel, a pulley upon said saw-mandrel belted to a feathered pulley mounted upon a slotted shaft journaled likewise in the sides of the sliding carriage, an endless screw or worm upon the extremity of the said slotted shaft at the front of the sliding carriage, a worm gear-wheel engaging said worm, and journaled to the sliding carriage and feathered to a slotted shaft journaled parallel to the trackway, a cone-pulley mounted upon the said slotted shaft and transmitting power therefrom by means of belt to another cone-pulley mounted upon the worm-shaft before described as operating to move the sliding carriage, combined with mechanism for reversing the last-mentioned worm-shafts, and mechanism for transmitting motion to the slotted main shaft mounted in the sliding carriage, substantially as described.

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

ANDREW MILLS.

Witnesses:
SAMUEL EMBERSON,
ROBINSON GILL.