2 Sheets—Sheet 1.

# W. E. HILL.

## SAW-MILL.

No. 178,638. Patented June 13, 1876.

Fig: 1.

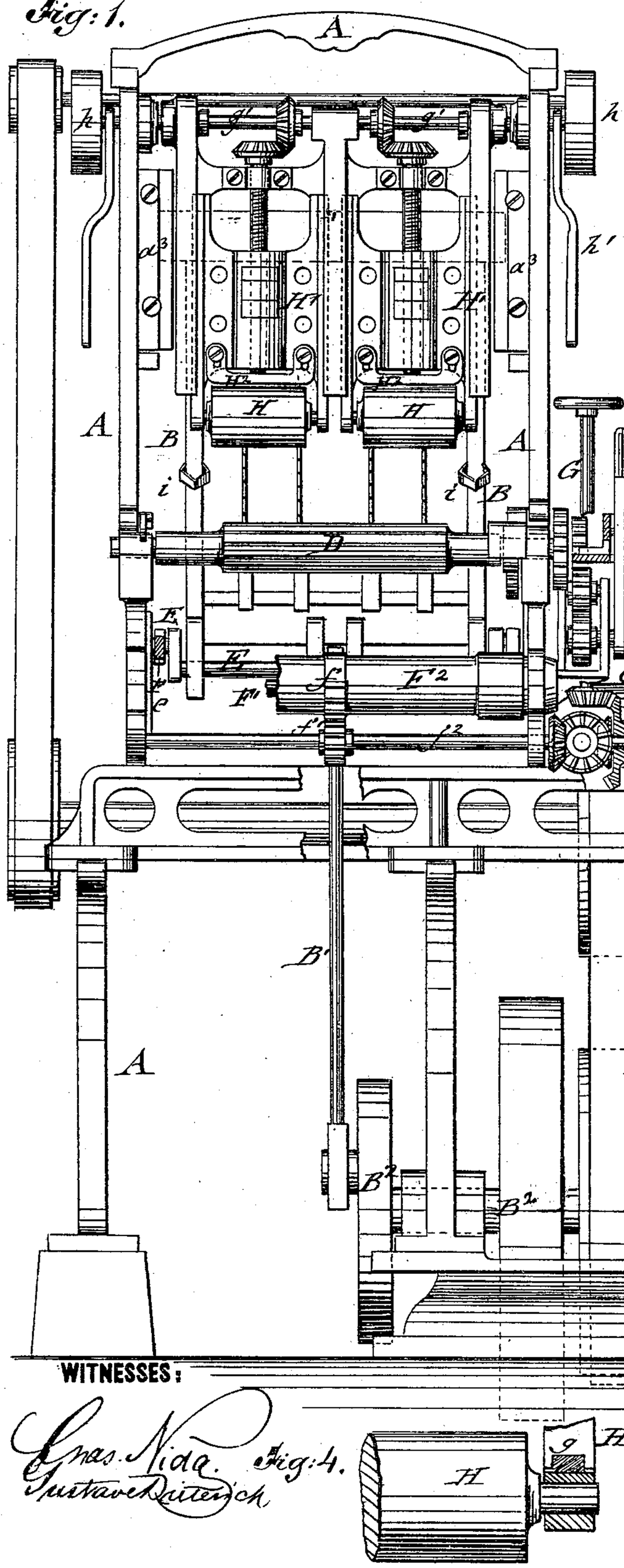


Fig: 2.

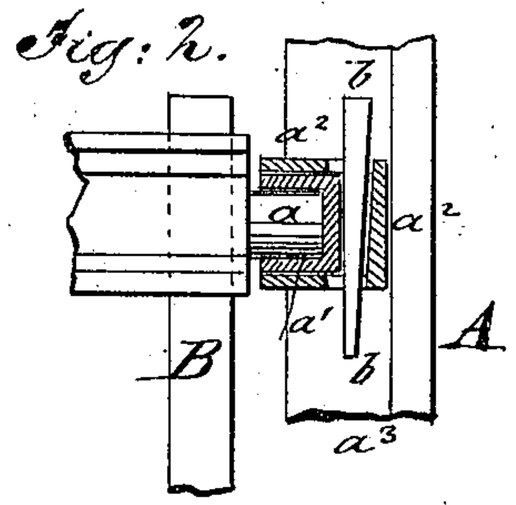


Fig: 3.

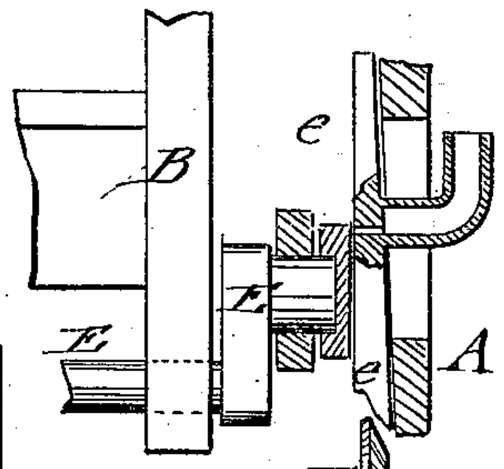


Fig: 4.




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2 Sheets—Sheet 2.

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## SAW-MILL.

No. 178,638. Patented June 13, 1876.

*Fig: 5.*

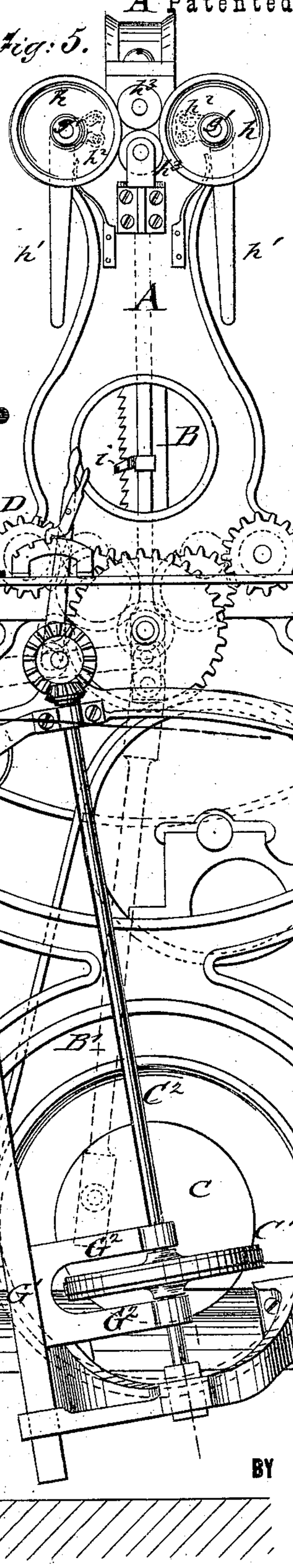



*Fig: 6*

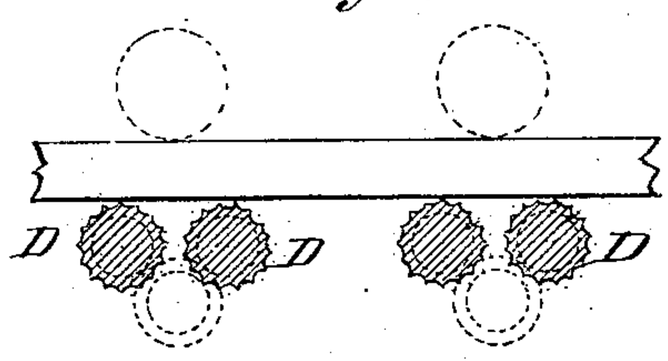
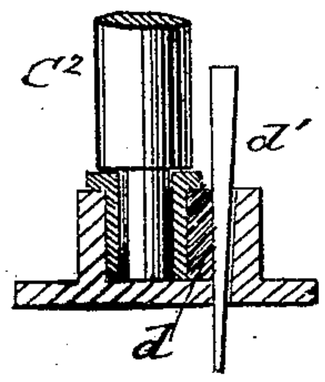



*Fig: 7.*




WITNESSES:

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INVENTOR:

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# UNITED STATES PATENT OFFICE.

WILLIAM E. HILL, OF ERIE, PENNSYLVANIA.

## IMPROVEMENT IN SAW-MILLS.

Specification forming part of Letters Patent No. **178,638**, dated June 13, 1876; application filed December 19, 1874.

*To all whom it may concern:*

Be it known that I, WILLIAM E. HILL, of Erie, in the county of Erie and State of Pennsylvania, have invented an Improvement in Saw-Mills, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a front elevation of my improved oscillating gang-saw; Figs. 2, 3, and 4, respectively, detail sections of the upper and lower saw-frame guides, and of the spring-journaled press-roller; Fig. 5, a side elevation of the gang-saw; Fig. 6, a detail section of the feed-rollers, showing relative position of the same; and Fig. 7, a detail section of the spring-acted bearing of the edge-disk shaft.

Similar letters of reference indicate corresponding parts.

The invention will first be fully described, and then pointed out in the claims.

In the drawing, A represents the supporting-frame of my improved gang-saw or muley, which is constructed of the usual material, and of such strength and size that the different mechanisms may be securely placed and applied thereto. The supporting-frame A extends, in the usual manner, through two stories, the floor over which the cants or logs are conveyed for being fed to the saws being arranged below the feed-rollers, while the saw-frame and driving mechanism extend below the floor. The saw-frame B is cast of solid metal, and hung at its upper end to trunnions $a$, which turn readily in sliding boxes $a^1$, that are adjustably set by wedge-pieces $b$ into sockets $a^2$, sliding by their flanged base parts in vertical guide-rails $a^3$ at the inside of the upright standards of frame A, Fig. 2. The saw-frame B is, by the sliding sockets and pivoted trunnions, capable of simultaneous reciprocating and swinging motion. Vertical reciprocating motion is imparted to the saw-frame, in the usual manner, from the pitman $B^1$ of the lower crank-shaft $B^2$, to which motion is transmitted by belt and pulley from the driving-shaft of the saw-mill.

The crank-shaft $B^2$ is provided at the outer end with a face-plate, C, keyed thereto, which rotates the edge plate or disk $C^1$, placed under right angles thereto, by means of frictional paper band at the circumference, in the customary manner. The edge disk $C^1$ is attached to its shaft $C^2$ in such a manner that it is vertically adjustable thereon for being placed nearer to or farther from the center of the face-plate C, but keyed to the shaft laterally, for transferring rotary motion thereto from the face-plate. The upper end of disk-shaft $C^2$ gears, by intermediate bevel-wheels and other gearing, with cog-wheels of the front and rear feed-rollers D, whose motion may be readily reversed by suitable lever mechanism, in the customary manner. The lower end of disk-shaft $C^2$ turns in suitable bearings, which are acted upon by a rubber or other spring, $d$, with adjustable wedge-piece $d'$, for the purpose of keeping up the continuous contact of the edge plate with the face-plate, for preventing any interruption in the regular action of the feed mechanism.

The lower part of the saw-frame B is connected, by a lateral rock-shaft, E, whose trunnions are sliding along wedge-plates $e$, which are set sidewise into the standards of frame A, and horizontally-arranged pitman-rods F, with a lateral shaft, $F^1$, that turns eccentrically in end bearings of an inclosing roll or box, $F^2$, which is adjustable by a central mutilated pinion, $f$, intermeshing wheel $f^1$ of connecting-shaft $f^2$, and suitable gearing from a vertical shaft and hand-wheel mechanism, G. The horizontal pitman-rods F communicate oscillating motion to the lower part of the saw-frame simultaneously with the reciprocating motion of the same, as imparted by the main pitman $B^1$.

The wedge-plates $e$, along which the ends of the rock-shaft E slide, are vertically adjustable by set-screws, to take up lost side motion or slack, and produce the exact and regular running of the saw-frame. The wedge-plates are oiled by suitable lubricators placed in connection therewith. The hand-wheel and shaft G are, furthermore, connected by intermediate shaft and gear-wheels with a toothed bar, $G^1$, that slides in upward or downward direction in suitable supporting-arms of frame A, and extends, by arms $G^2$ cast therewith, to the disk-shaft, embracing the same by their perforated ends, and acting on the upper and lower part of the edge disk, for raising or lowering the same, as required. The nearer the edge disk is car-

ried toward the center of the face-plate the slower is the feed, and the more it is moved away from the center the greater is the speed of the feed-roller.

By the shaft and hand-wheel mechanism G the position of the edge disk on the face-plate, that regulates the speed of the feed-rollers, is produced simultaneously with the position of the eccentric box $F^2$, which regulates the oscillations of the saw-frame, so that thereby the speed of the feed corresponds exactly to the size of the oscillations of the saw-frame.

The logs are fed against the saw or saws, and cut by the downstroke of the same, producing, by the slight inclination during the downstroke, the equal cutting of all the teeth, until at the lower part of the downstroke the saws are carried back far enough to give the sawdust a chance to drop or fall out before the saws get any perceptible upward motion. This prevents the teeth from carrying the sawdust back up into the cuts, and avoids thereby the choking or clogging of the saw-teeth while coming down for the next cut. The receding of the saws from the cuts admits the regular forward feed of the logs during the rearward oscillation of the saws, and brings the saw-teeth, at the completion of the upward stroke, forward again, to meet the cleared cuts and cause the cutting of the logs exactly at the commencement of the downstroke. The cutting is thus accomplished in the shortest time compatible with the clearing of the cuts, and in intimate connection with the feed mechanism. The log-carrying feed-rollers D at the front and rear of the saw-frame are provided with wide or coarse and shallow fluting, and attached by their shafts in such position to their gearing that when the edges of the fluting of a front and rear roller are at the highest point to support the logs, two adjoining edges of the other front and rear roller are in horizontal position, at a point slightly below the higher edges of the other rollers, so as not to be in contact with the logs, but take hold of the same alternately with the other rollers, according as the relative position of their fluted edges changes during the rotation of the rollers. The object of thus gearing the feed-rollers D is to prevent the cant or log from rising or lowering when it feeds up, as it would do if the flutes had the same relative position, while it allows, also, the employment of wider fluting instead of the small, deep fluting hitherto in use, and obviates thereby the packing or sticking of the sawdust therein.

The logs are held at the top by means of press-rollers H, whose shafts are loosely journaled by rubber or other springs, *g*, to swinging frames $H^1$, hung to shafts at the top part of frame A, for passing readily over uneven top parts of the log. Slotted scraper-plates $H^2$ are applied adjustably to studs above the press-rollers, for cleansing them from the pitch and other adhering parts. The swinging roller-frames $H^1$ are secured in position by lateral detachable rods, seated in recesses of the side standards, and may, on taking them out, be readily swung up out of the way, for inserting or adjusting the saws in the saw-frame. The press-rollers H are vertically adjustable, by suitable screws, shafts, and gearing, from the lateral top shaft *g'*, which carries an outer friction-pulley, *h*, which is set by a forked spring lever-handle $h^1$ to pins $h^2$ of the pulley *h*, for being applied to either the upper or lower of two friction-pulleys, $h^3$, which are revolved in opposite direetions, by belt and pulley, from the driving-shaft. By pressing the lever-pulley to either of the revolving friction-pulleys the motion is instantly transmitted to the press-rollers, which are thereby raised or lowered and quickly adjusted to the logs. The lever mechanism and friction-pulleys are shown clearly in Figs. 1 and 5. The side pieces or stiles of the saw-frame B are provided with one or more choppers, *i*, for the purpose of cutting an opening through the log when the same is too large for the frame, so that the stiles may pass on without requiring the stopping of the machine, while cutting off, also, protruding parts of the log or cant.

The logs are thus fed forward, by means of readily-adjusted mechanism, in a steady and uniform manner, and exposed to the action of the saw or saws, with a view to a rapid and unobstructed cutting in connection with a reliable and accurately-controlled working of all the parts, so as to form a gang-saw or muley construction of superior advantages in regard to economy, efficacy, and durability.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with saw-frame B, having trunnions *a*, of the sliding boxes $a^1$, sockets $a^2$, guide-rails $a^3$, and wedges *b*, as and for the purpose described.

2. The combination, with shaft-bearing, of the rubber *d* and wedge *d'*, constructed and arranged substantially as and for the purpose set forth.

3. The combination of hand mechanism G, shaft $f^2$, having pinion $f^1$, box $F^2$, having mutilated pinion *f*, the eccentric shaft $F^1$, pitman F, and sliding shaft E, with the saw-frame B, as and for the purpose specified.

4. The sliding tooth-bar $G^1$, having arms $G^2$, combined with edge disk $C^1$ and shaft $C^2$, as and for the purpose described.

WILLIAM E. HILL.

Witnesses:

PAUL GOEPEL,

ALEX. F. ROBERTS.