(No Model.) 5 Sheets—Sheet 1.

S. A. GOULD.

SAW SHARPENING MACHINE.

No. 365,337. Patented June 21, 1887.

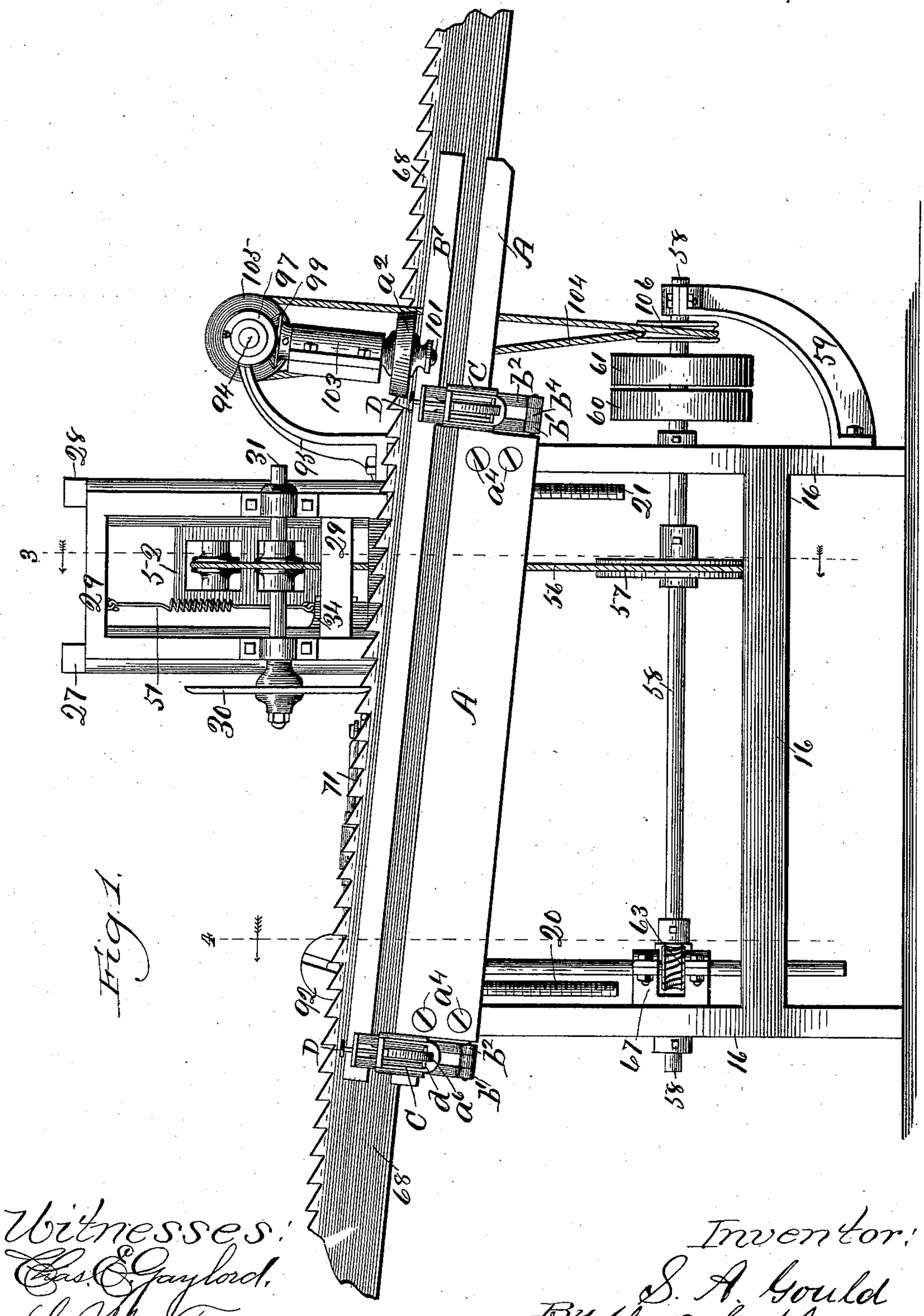

Fig. 1.

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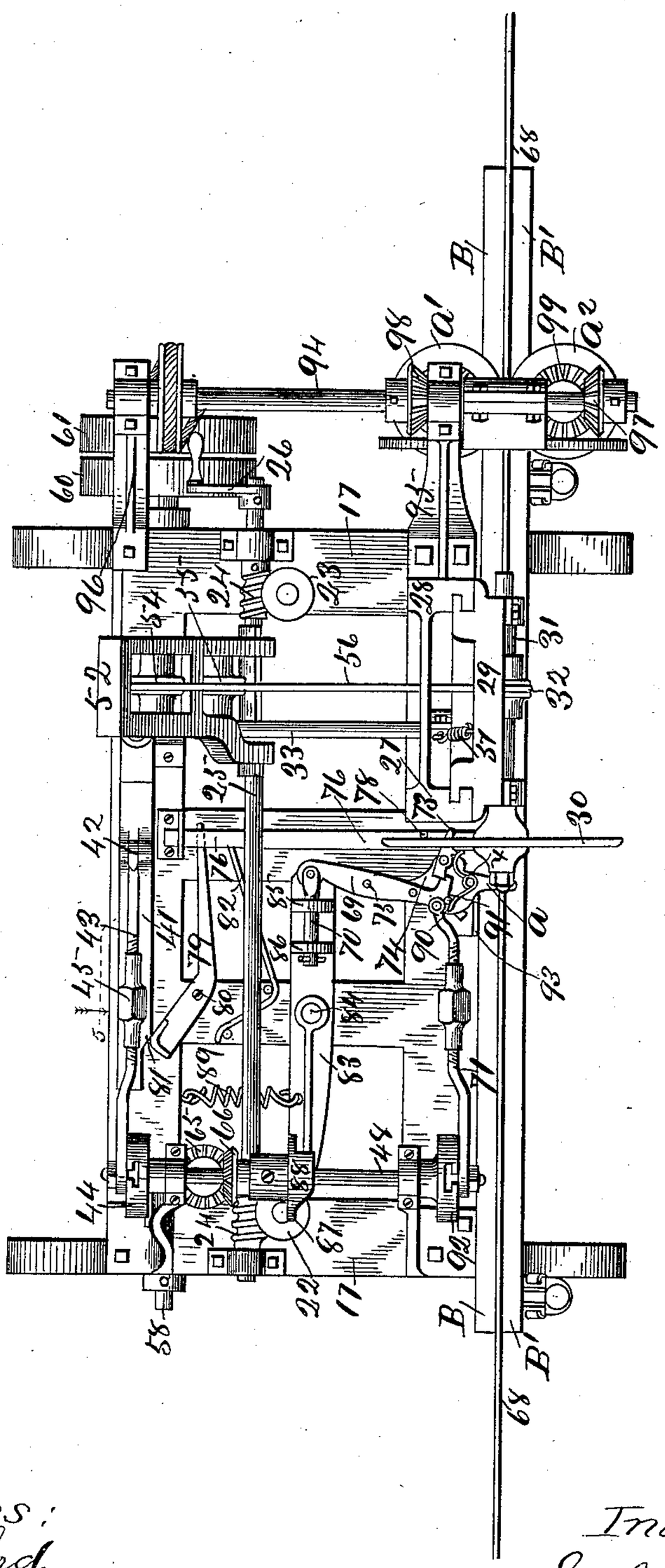

Fig. 2.

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SAW SHARPENING MACHINE.

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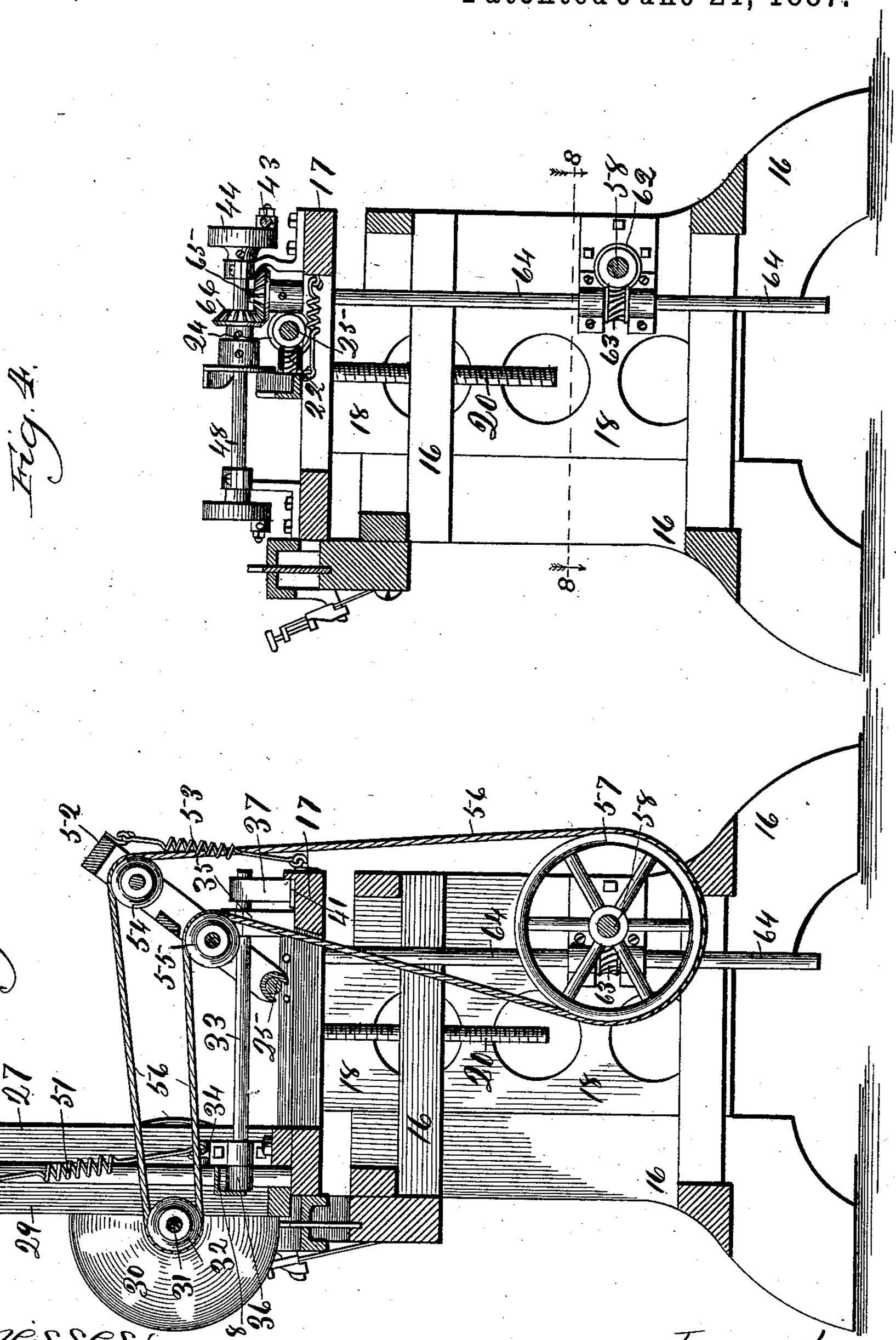

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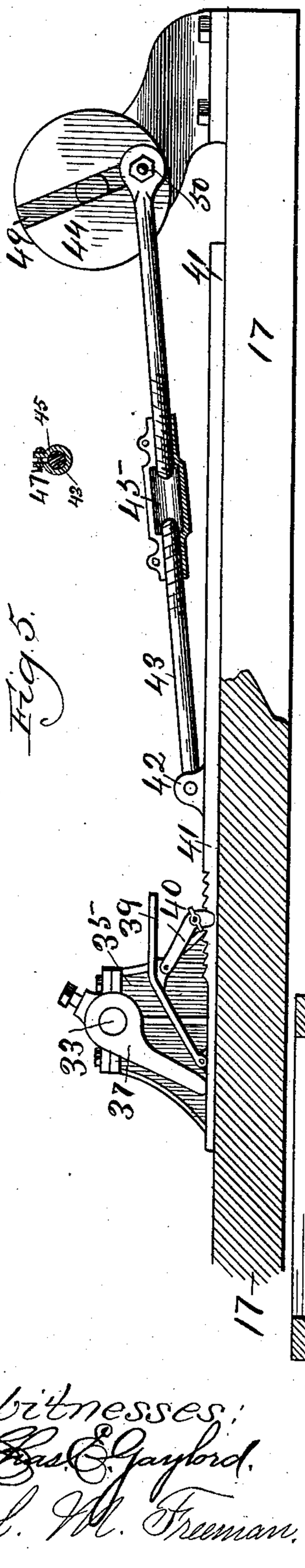

Fig. 5.

Fig. 8.

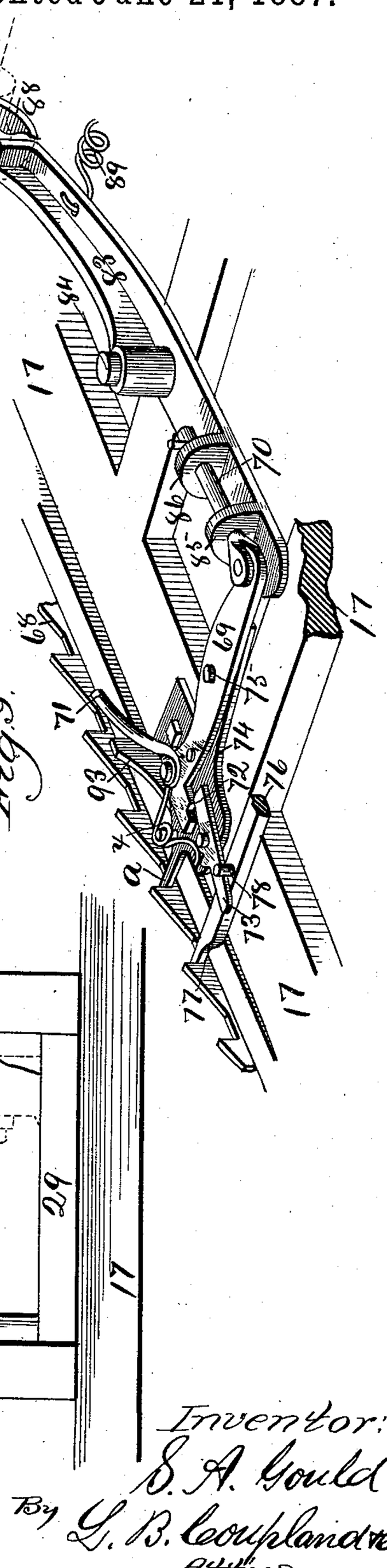

Fig. 9.

Fig. 6.

Fig. 7.

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S. A. GOULD.

SAW SHARPENING MACHINE.

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Fig. 11.

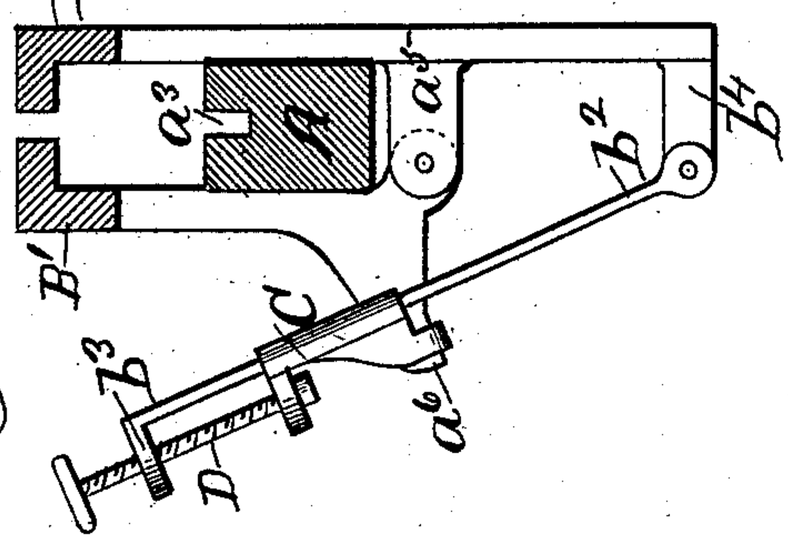


Fig. 13.

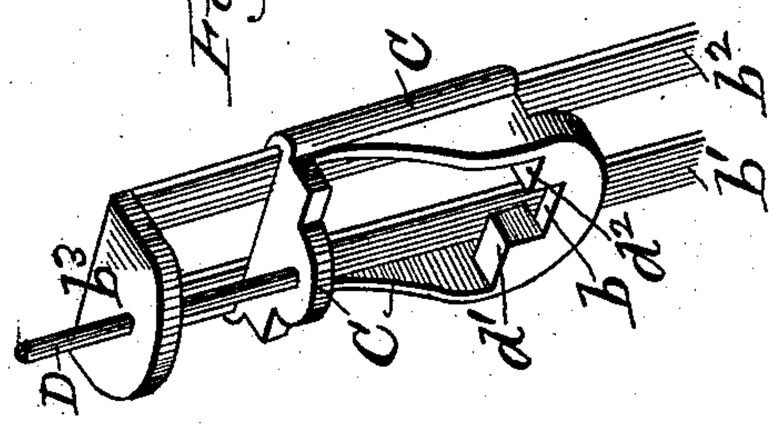


Fig. 14.

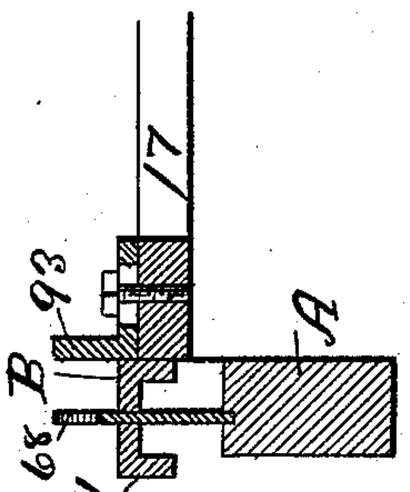


Fig. 15.

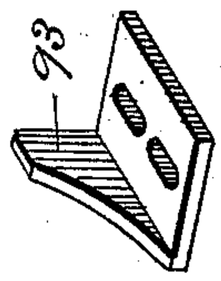


Fig. 12.

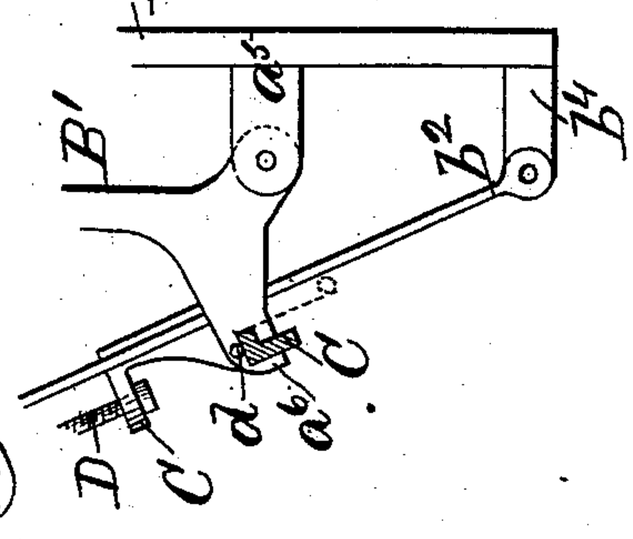
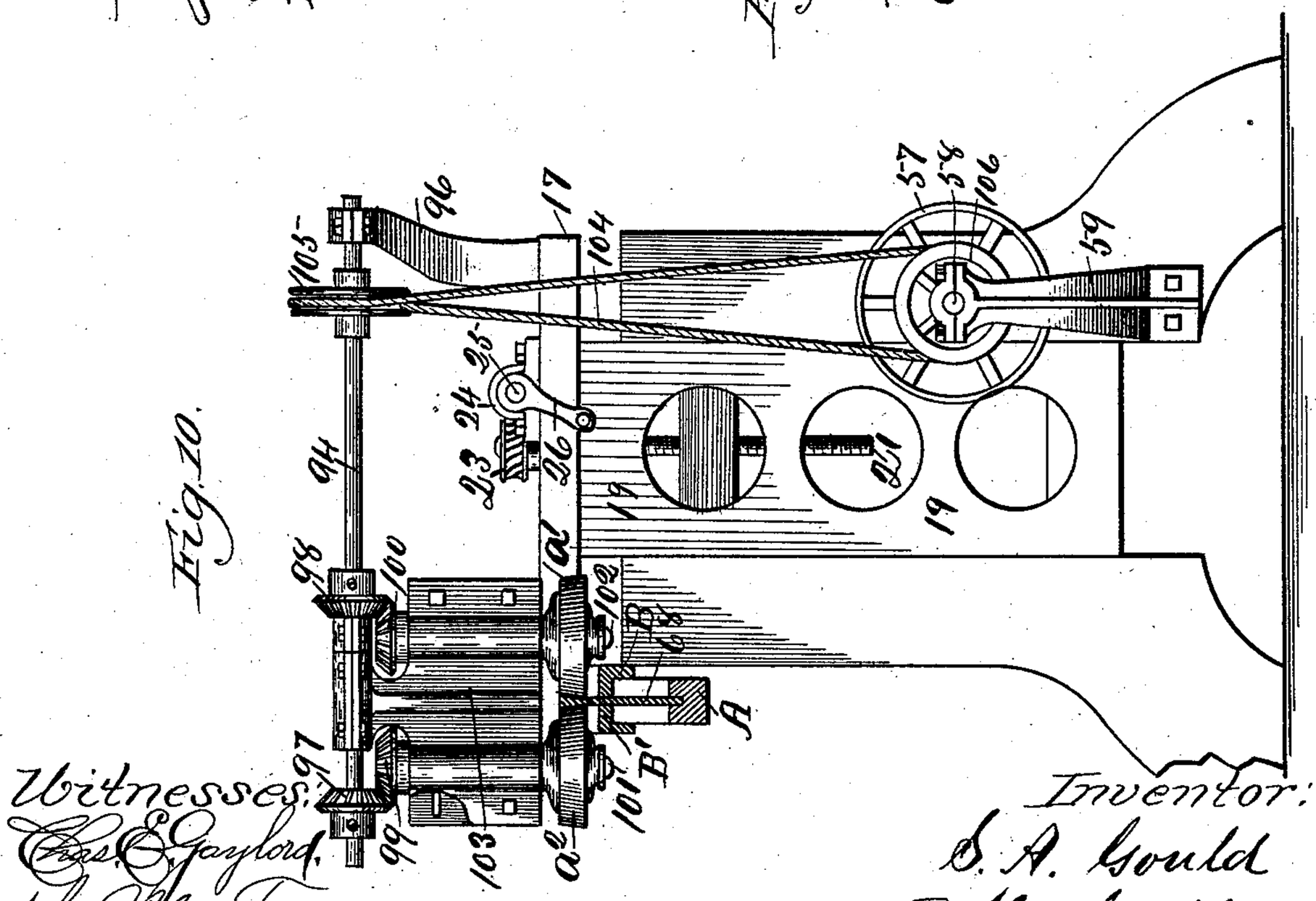


Fig. 10.



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UNITED STATES PATENT OFFICE.

SAMUEL A. GOULD, OF CHICAGO, ILLINOIS, ASSIGNOR TO JOHN C. BURMEISTER, OF SAME PLACE.

SAW-SHARPENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,337, dated June 21, 1887.

Application filed October 16, 1886. Serial No. 216,393. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL A. GOULD, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Saw-Sharpening Machines, of which the following is a full, clear, and exact description, that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in that class of automatic saw-sharpening machines that are more especially designed for dressing straight and band saws; and the same consists in the combination, arrangement, and operation of the several parts, as will be hereinafter set forth in detail, and pointed out in the claims.

Figure 1 is a front elevation of a machine embodying my improved features; Fig. 2, a plan or top view; Fig. 3, a vertical transverse section in the plane 3, Fig. 1, looking in the direction indicated by the arrows; Fig. 4, a similar view in the plane 4, Fig. 1. Fig. 5 shows the rear upper part of the machine, partly in section, as indicated in the plane 5, Fig. 2. Fig. 6 is a horizontal section in the plane 6, Fig. 7, showing the emery-wheel gate and the vertical frame in which the same moves; and Fig. 7 is a broken-away side elevation of the same. Fig. 8 is a horizontal section in the plane 8, Fig. 4. Fig. 9 is a perspective of the mechanism for feeding the saw to the emery-wheel. Fig. 10 is an end elevation. Figs. 11, 12, and 13 illustrate a clamping device for holding the saw during the operation of sharpening, and Figs. 14 and 15 are sectional details.

In the drawings, 16 represents the supporting frame-work proper, and 17 a rectangular horizontal table or auxiliary frame placed on top of or just above the main frame. This table is supported at each end on the vertical adjustable slides 18 and 19, which have dovetailed bearings in the vertical end parts of the main frame, as shown in Figs. 3, 4, 8, and 10.

The table 17 has mounted thereon the principal part of the working mechanism, and may be raised or lowered for saws of different widths by means of the vertical screws 20 and 21, located at each end, as shown in Fig. 1. These screws have threaded bearings in the transverse parts of the main frame, (see Figs. 3, 4, and 10,) and have the pinions 22 and 23 mounted on the upper ends thereof. These pinions engage with the worm-gear 24, mounted on and near each end of the horizontal shaft 25. This shaft runs lengthwise of and is provided with suitable journal-bearings on the upper side of the table, and has the hand-crank 26 mounted on one end of the same, by which means the horizontal shaft 25 and the vertical screws 20 and 21 may be rotated in either direction for the purpose of simultaneously bringing both ends of the table to the required position.

27 and 28 are two uprights set on the front part of the table, which support and provide bearings for the vertical reciprocating emery-wheel gate 29. This gate consists of a rectangular frame inclosing a corresponding opening.

The emery or sharpening wheel 30 is mounted on the inner end of the arbor 31, which is in turn provided with suitable journal-bearings in the gate 29, as shown in Fig. 1.

32 is a band-pulley mounted centrally upon the arbor 31.

33 is a transverse rock-shaft, (see Figs. 2, 3, 5, 6, and 7,) the front end of which is journaled in the lug 34, attached to the upright 27, the opposite end of said shaft being journaled in the bearing-box 35, set on the back part of the table, as shown in Fig. 5. The rock-shaft 33 has the rocker-arm 36 mounted on the front end, (see Fig. 7,) while the opposite or back end is provided with the companion arm 37, as shown in Figs. 3 and 5. The arm 36 bears against the under side of the cross-plate 38, (see Figs. 3, 6, and 7,) placed transversely in the lower part of the emery-wheel gate. By this means an upward movement is imparted to the gate and emery-wheel, the dotted lines, Fig. 7, indicating the circular plane in which the arm 36 moves. The companion rocker-arm 37 on the opposite end of the rock-shaft 33 is arranged to have frictional contact with the upper side of the inclined adjustable guide 39, as shown in Fig. 5. The upper end of the adjusting-pawl 40 is pivoted to the under side of said inclined guide, the lower end engaging with the teeth in the rack-bar 41. This rack-

bar is provided on the upper side with the lug 42, to which is attached one end of the connecting-rod 43, the opposite end being connected to the crank-wheel 44. This connecting-rod is in two parts, (see Fig. 5,) the joining ends having a right and left screw-thread, and are secured relative to each other by means of the nut or sleeve 45, which is correspondingly threaded, and whereby the connecting-rod 43 may be shortened or lengthened, as required, in adjusting and setting the mechanism for different saws, in accordance with the distance or space between the teeth. The nut 45 is split and provided with clamping-bolts 47, so that the same may be securely locked in the position to which it is adjusted.

The crank-wheel 44 is mounted on the back end of the counter-shaft 48, and is provided with the slot 49, so that the crank-pin 50 may be moved in the direction of or away from the center, thus providing another means for changing the throw or travel of the connecting parts. By this arrangement a forward movement of crank-wheel 44 produces a corresponding movement of the rack-bar 41, and gradually raises the outer end of the rocker-arm 37 by bringing the inclined guide 39 in contact with the same, thus rotating the rock-shaft 33 and raising the emery-wheel gate by means of the rocker-arm 36, mounted on the front end of the rock-shaft. On the return part of the stroke the rack-bar is gradually withdrawn and the emery-wheel as gradually gravitates to its lowest position, bringing the sharpening-wheel in contact with the saw. The spiral spring 51 also assists the emery-wheel gate on the downstroke. Shifting the lower end of pawl 40, so as to bring the same nearer to an upright position, adjusts these parts for saws having longer teeth, and in the opposite or horizontal direction for shorter teeth.

The lower end of the inclined belt tightener frame 52 has a loose pivotal bearing on shaft 25, so that the rotation of said shaft does not affect the position of the tightener. This tightener rests against the bearing-box 35, and is yieldingly retained in that position by the spiral spring 53.

54 and 55 are pulley-sheaves journaled in the tightener-frame, over which runs the driving-belt 56, transmitting motion from the pulley-sheave 57, (see Figs. 1 and 3,) mounted on the driving-shaft 58, to the emery-wheel arbor. The main or driving shaft 58 is provided with suitable bearings in the lower part of the frame, one end projecting and being journaled in the curved bracket-arm 59, as shown in Fig. 1.

60 and 61 are the usual band-pulleys for receiving the motion from the motive power. The opposite end of the driving-shaft is provided with the worm-wheel 62, which engages with pinion 63, mounted on the vertical shaft 64. The upper end of this vertical shaft projects above the table and is provided with the beveled pinion 65, (see Figs. 2 and 4,) which engages with the companion pinion 66, mounted on the transverse shaft 48, thus transmitting the required motion from the driving-shaft to and thereby actuating the mechanism located on the adjustable table. The pinion 63 is feathered on the vertical shaft 64 and placed between the jaws of the bracket-bearing 67, (see Fig. 1,) so that when the adjustable table is raised or lowered the shaft 64 is free to move with the same, the pinion remaining in the same position.

The mechanism for feeding the saw 68 to the sharpening-wheel will now be described. This mechanism consists of a number of parts or pieces, and is so constructed and arranged as to feed the saw by engaging with a tooth other than the one next to be sharpened. One end of the horizontal transverse lever 69 is pivoted to the bifurcated end of the short shaft 70, (see Figs. 2 and 9,) the opposite end being attached to the inner end of the connecting-rod 71. The outer end of this lever is bent at right angles and provided on the inner side with the shoulder 72, which has an intermittent engagement with one end of the trigger 73. (Shown in an engaged position in Fig. 2, and disengaged in Fig. 9.)

74 is the feed-lever proper, and is secured to the under side of the lever 69 by means of the pivot-post 75. The lever 74 is broadened in the direction of the front part, the extreme end terminating in the feed-finger *a*, engaging with the teeth of the saw, as shown in Fig. 9. The trigger 73 is pivoted near its longitudinal center to the wider part of lever 74. The tripping-bar 76 lies in a horizontal plane and is adapted to have an endwise movement, both ends being secured against a lateral movement. The front end of this tripping-bar is cut away (see Fig. 9) on one side to form the shoulder-stop 77, which limits the outward movement of the bar as it engages with the saw. The post 78, inserted in the tripping-bar, comes in contact with one end of the trigger 73 and throws the opposite end out of engagement with the lever 69 at the moment the saw is moved far enough to bring the next tooth into the exact position to be operated upon by the sharpening-wheel. The spring *x* returns the trigger to an engaged position with the lever 69. The horizontal rocking lever 79 is placed at right angles to the tripping-bar, and is secured to the table by the pivot-pin 80. (Shown in Fig. 2.) The narrowed end of this lever is inserted in the back part of the tripping-bar, the opposite bent end having frictional contact with the back end of the rack-bar 41. The rack-bar is cut away at this point to form the beveled shoulder 81 in the path of the bent end of lever 79. When the rack-bar is moving back, the wider part of the same is brought in contact with the bent end of lever 79 and forces the same inward, causing a corresponding movement of the opposite end in a rearward direction, and thus withdrawing the tripping-bar 76 from engagement with the saw. The forward movement of the rack-bar brings the beveled shoulder on

the same opposite the bearing end of lever 79, which gradually reaches the narrow part of the rack-bar, and is held in a constant bearing against the same by means of the tension of the spring 82, which is attached to and throws the tripping-bar 76 outward at the proper time to stop the feed on the saw. The horizontal rocking lever 83 is mounted near its longitudinal center on the vertical pivot-post 84. The inner end of lever 83 is provided on the upper side with the lugs 85 and 86, which support shaft 70. The opposite or outer end of lever 83 is turned upward at right angles, and has frictional contact with that side of the cam-wheel 87 provided with the segmental cam projection 88. This cam-wheel is mounted on shaft 48, as shown in Figs. 2 and 4, the relative position of the same being indicated also by dotted lines in Fig. 9. Every time that the cam-wheel 87 revolves, the segmental projection on the same moves that end of lever 83 in contact with the cam laterally toward the front of the machine, the inner end moving in the opposite direction and withdrawing the compound feed-lever back endwise from engagement with the saw. The spring 89 serves to return lever 83 to its opposite position and throw the feed mechanism into engagement with the saw when the cam projection has passed by. The post 90 (see Fig. 2) is inserted in the feed-lever 74, and is adapted to have loose contact with shoulder 91, formed on the end of lever 69. The post 90 and shoulder 91 cease to have contact on the forward part of the stroke; but on the back movement they engage, so that lever 69 draws back feed-lever 74 to engage with the next tooth. The connecting-rod 71 is of the same adjustable construction as the companion rod 43, and for the same purpose is adjustably connected to crank-wheel 92, mounted on the front end of shaft 48. The adjustable angle-plate 93 (see Figs. 9, 14, and 15) presents an inclined surface, which gradually raises the outer ends of the compound feed-levers on the back part of the stroke to bring the feed-finger to the required elevation on each movement to engage with the next tooth. The shaft 70 has a slight rotary movement when the front ends of the feed levers rise, which is necessary to insure a free movement of these parts. The different parts forming the feed mechanism may be readily adjusted relative to each other so as to move and co-operate at the proper time.

At the opposite end of the machine is placed the transverse shaft 94, journaled and supported in the curved standards 95 and 96. (See Figs. 1, 2, and 10.)

On the front part of shaft 94 are mounted the beveled pinions 97 and 98, which engage with the companion pinions 99 and 100 on the vertical shafts 101 and 102. These shafts are provided with the double bearing-box 103, supported on shaft 94, and have the beveled emery-wheels a' a^2 mounted on the lower ends thereof. The emery-wheels are shown in contact with the saw and are arranged to side-dress the teeth. Motion is transmitted from the driving-shaft to shaft 94 by means of the belt 104, running over companion pulley-sheaves 105 and 106, mounted on said shafts.

Instead of having the emery-wheels for side-dressing beveled, the vertical shafts carrying the same may be so arranged as to be adjusted to any desired incline.

Figs. 11, 12, and 13 illustrate a clamping device for holding the saw in position during the operation of sharpening the same, two of these clamping devices being used on each machine, their relative position being shown in Fig. 1.

A is a bar provided on the upper side with the groove a^3 to receive the back of the saw. This bar and the fixed clamping-jaw B are secured to the frame by the screws a^4. (Shown in Fig. 1.) The movable or adjustable jaw B′ is pivoted or hinged to the lug a^5, projecting outwardly from the fixed jaw. The lower part of the jaw B′ is also provided with the projecting nose a^6, which is adapted to engage with the notch b (see Fig. 13) in the lower part of the slide C, which has a vertical adjustment on the guides b' b^2. The upper ends of these guides are connected by the cap-plate b^3, the lower ends being pivoted to the lug b^4, projecting outwardly from the lower part of the fixed clamping-jaw B. The pin d is inserted in and projects laterally from each side of the nose a^6, and when the jaws are in a clamping position the ends of this pin rest on the seats d' d^2 in the slide C, on each side of the notch b. When the slide and the guides on which the same moves are thrown outward for the purpose of inserting or of removing the saw, the nose a^6 is disengaged from the slide and the pin passes down between the back of the slide and the inner side of the guides, as indicated in Fig. 12, thus preventing these parts from being entirely separated.

The hand-screw D serves to regulate the tension of the clamping-jaws on the saw.

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

1. In a saw-sharpening machine, the combination, with the main supporting-frame, of the table 17, the slides 18 and 19, the vertical screws 20 and 21, the horizontal hand-shaft 25, and the geared connection described, whereby motion is transmitted from said shaft to said screws and both ends of the table adjusted simultaneously, substantially as and for the purpose set forth.

2. In a saw-sharpening machine, the rock-shaft 33, provided with suitable journal-bearings and having the rocker-arms 36 and 37 mounted on the respective ends thereof, in combination with the emery-wheel gate 29, the adjustable guide 39, the adjusting-pawl 40, the rack-bar 41, the connecting-rod 43, the crank-wheel 44, the counter-shaft 48, and the

means described for transmitting motion from the driving-shaft to said counter-shaft, substantially as and for the purpose set forth.

3. In a saw-sharpening machine, the combination, with the horizontal lever 69, of the feed-lever 74, provided with the feed-finger *a*, and pivoted to the under side of said lever 69, the adjustable connecting-rod 71, the crank-wheel 92, the counter-shaft 48, and the means described for transmitting motion to said counter-shaft, substantially as and for the purpose set forth.

4. In a saw-sharpening machine, the combination, with the horizontal lever 69, having the outer end turned at right angles and provided with the shoulder 72, of the feed-lever 74, the trigger 73, the spring *x*, the tripping-bar 76, provided with the shoulder-stop 77 and post 78, the rocking lever 79, the rack-bar 41, provided with the beveled shoulder 81, and the spring 82, all substantially as and for the purpose set forth.

5. In a saw-sharpening machine, the combination, with the horizontal lever 69, of the companion feed-lever 74, the shaft 70, the rocking lever 83, provided on the inner end with lugs 85 and 86, while the outer end is turned upward at right angles, the cam-wheel 87, mounted on the counter-shaft 48 and provided with the segmental projection 88, and the spring 89, whereby the ends of said lever 83 are caused to have a lateral movement, first in one direction and then in the other, for the purpose of throwing the feed-lever into and out of engagement with the saw, substantially as set forth.

6. In a saw-sharpening machine, the combination, with the feed-lever 74, of the post 90 and the companion lever 69, provided with the shoulder 91, as and for the purpose set forth.

7. In a saw-sharpening machine, the combination, with the compound feed-levers 69 and 74 and the shaft 70, of the angle-plate 93, having an inclined surface, whereby the feed-lever is raised to the proper height to engage with the next tooth, as set forth.

8. In a saw-sharpening machine, the combination, with the transverse shaft 94, journaled in the curved standards 95 and 96, of the pinions 97 and 98, mounted on said shaft, the vertical shafts 101 and 102, the companion pinions 99 and 100, mounted on the upper ends of said vertical shafts, and the emery-wheels a' a^2, mounted on the lower ends of said vertical shafts, all substantially as and for the purpose set forth.

9. In a saw-clamping device, the combination, with the fixed jaw B, provided with lugs a^5 and b^4, of the adjustable jaw B′, provided with the nose a^6, the pin *d*, the slide C, the guides b' b^2, and the hand tension-screw D, all substantially as and for the purpose set forth.

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