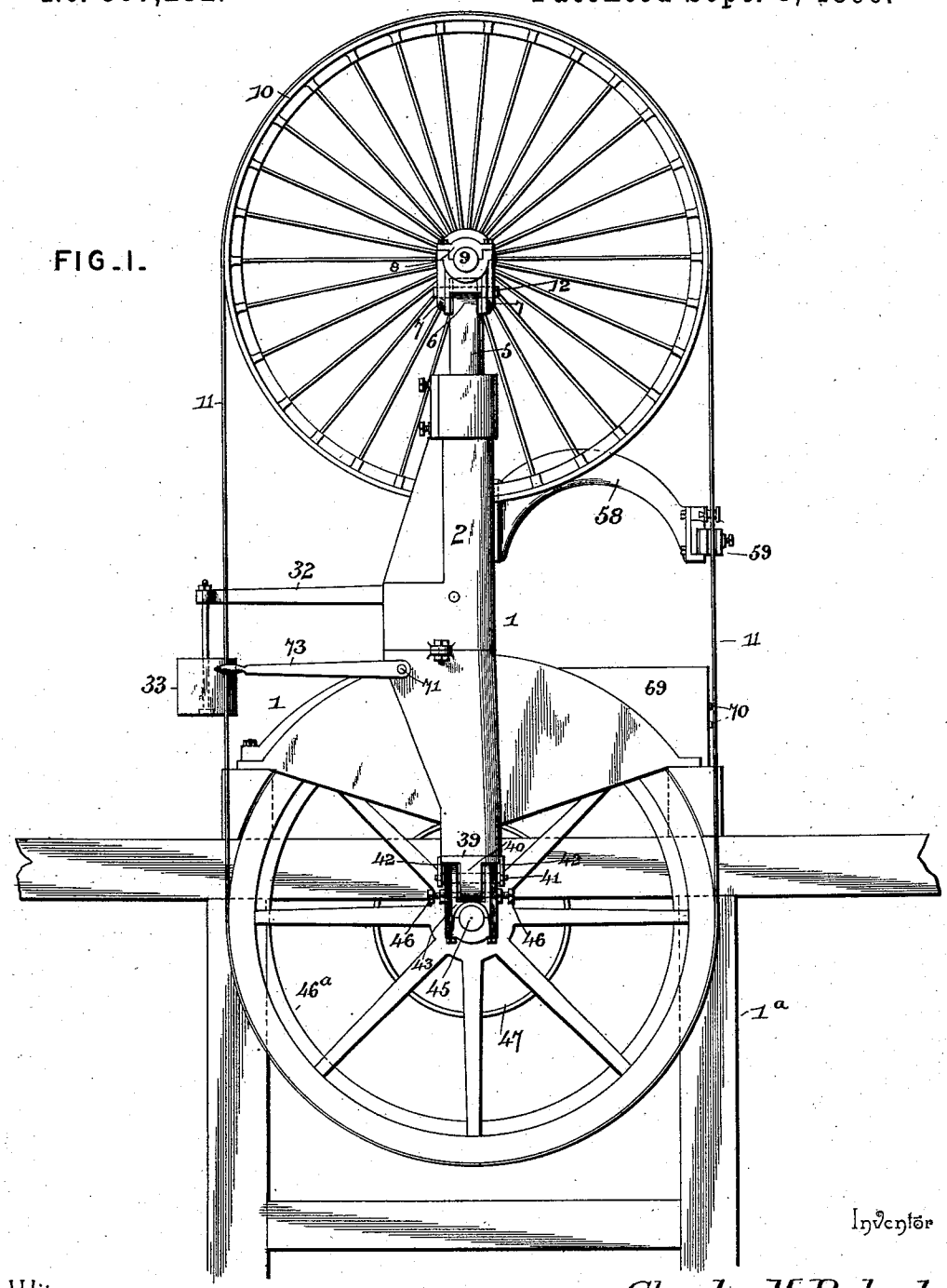
(No Model.) 4 Sheets—Sheet 1.

C. H. ROBERTS.

BAND SAW MILL.

No. 567,282. Patented Sept. 8, 1896.

FIG. 1.



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(No Model.) 4 Sheets—Sheet 2.

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FIG. 2.

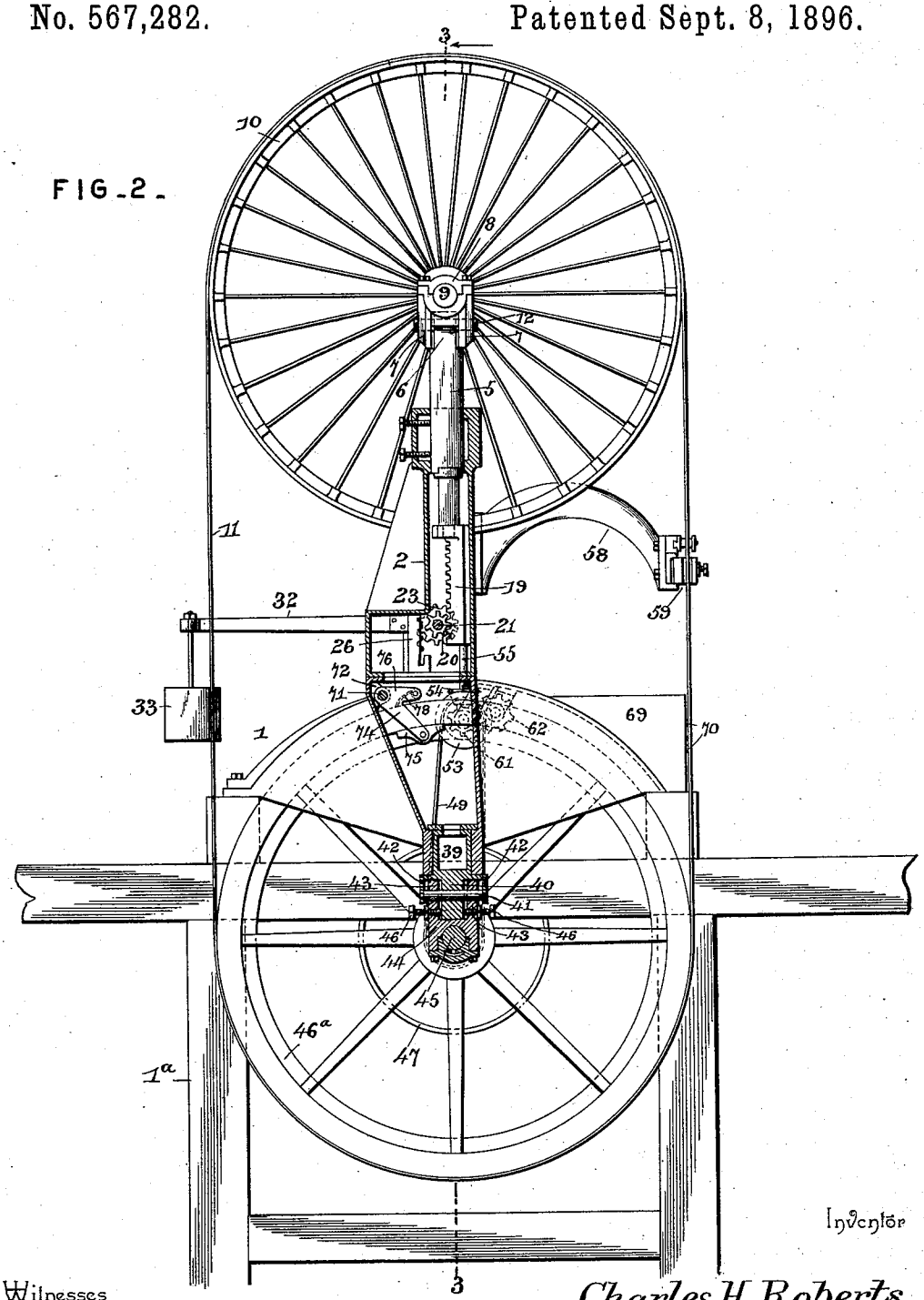

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FIG. 3.

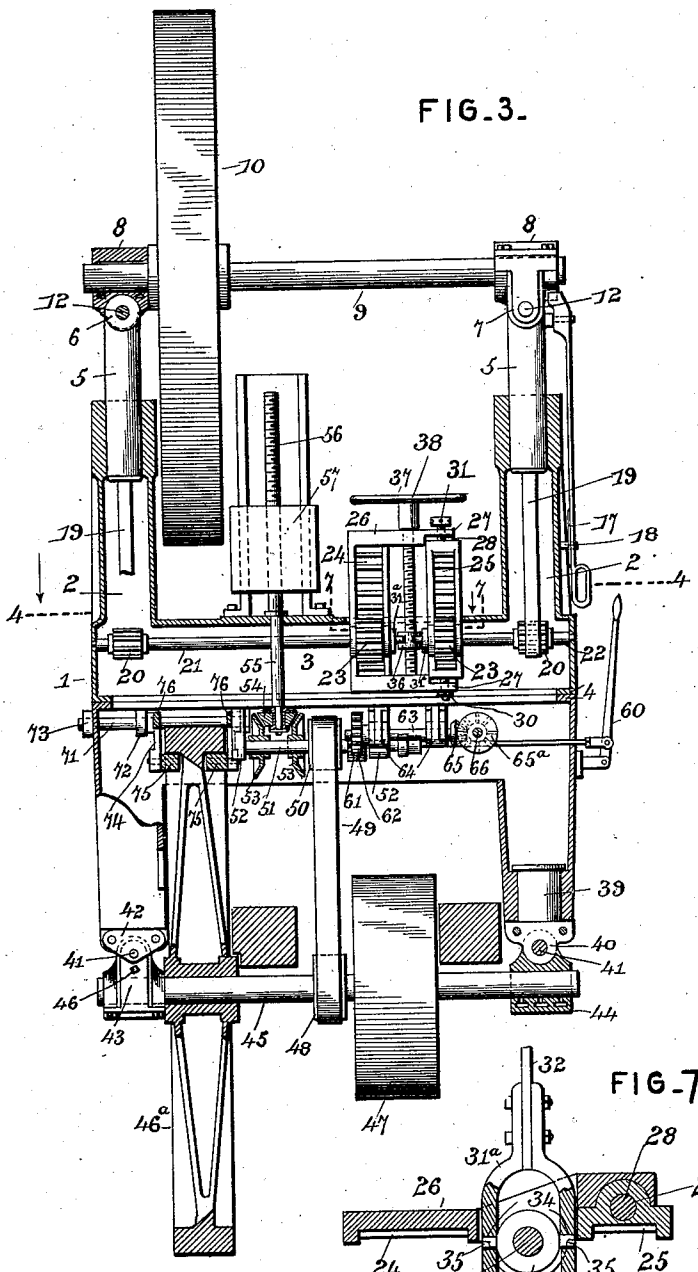

FIG. 7.

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BAND SAW MILL.

No. 567,282. Patented Sept. 8, 1896.

FIG. 4.

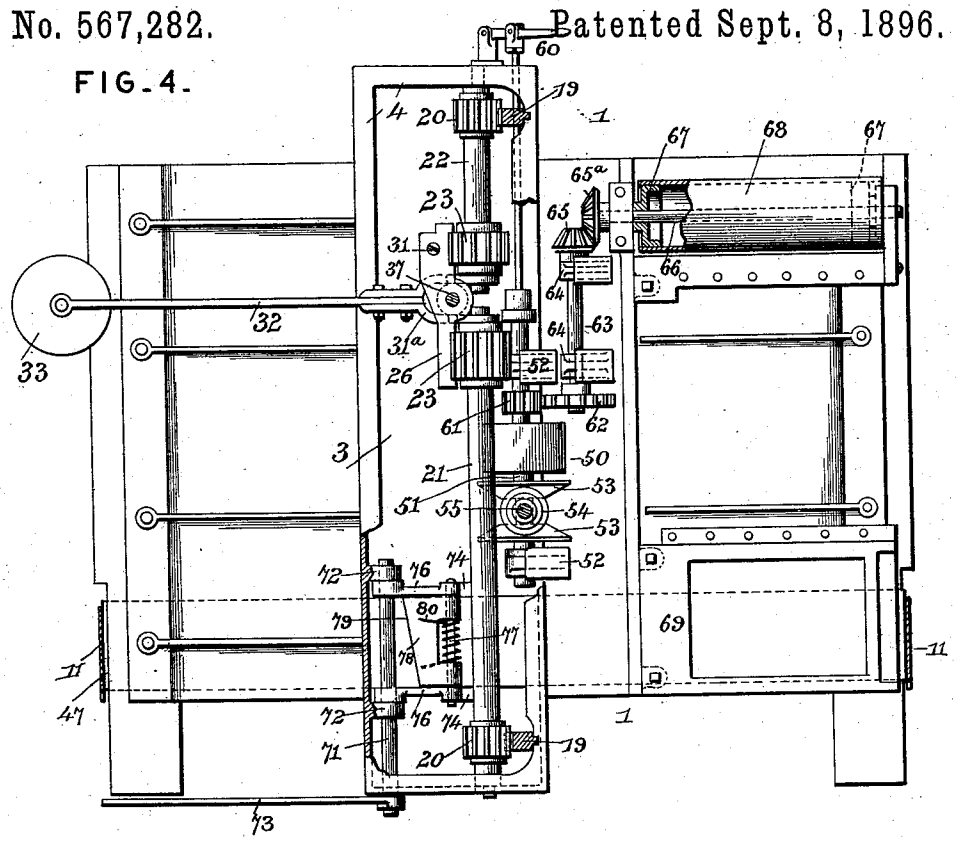
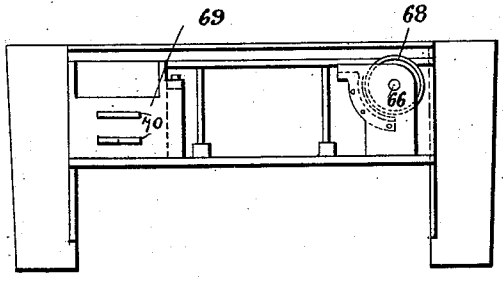


FIG. 5.



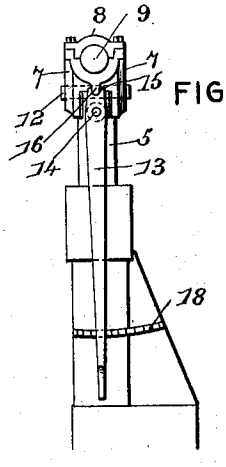


FIG. 6.

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UNITED STATES PATENT OFFICE.

CHARLES H. ROBERTS, OF EVANSVILLE, INDIANA, ASSIGNOR TO THE MURRAY IRON WORKS COMPANY, OF BURLINGTON, IOWA.

BAND-SAW MILL.

SPECIFICATION forming part of Letters Patent No. 567,282, dated September 8, 1896.

Application filed January 23, 1895. Serial No. 535,946. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. ROBERTS, a citizen of the United States, residing at Evansville, in the county of Vanderburg and State of Indiana, have invented a new and useful Band-Saw Mill, of which the following is a specification.

This invention relates to band-saw mills; and it has for its object to effect certain improvements in mills of this character, whereby the parts thereof may be more readily and accurately adjusted to suit the requirements of the work and the different sizes of saws employed, while at the same time contemplating novel and efficient means for maintaining the band-saw at the proper tension or suitably strained.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a side elevation of a band-saw mill constructed in accordance with this invention. Fig. 2 is a vertical sectional view thereof at one side of the upper and lower band-saw wheels. Fig. 3 is a vertical sectional view on the line 3 3 of Fig. 2. Fig. 4 is a horizontal sectional view on the line 4 4 of Fig. 3. Fig. 5 is a detail elevation of that portion of the mill forming the lumber-table for sawed lumber. Fig. 6 is a detail side elevation of the adjusting device for one of the journal-boxes of the upper wheel-shaft. Fig. 7 is an enlarged detail sectional view on the line 7 7 of Fig. 3.

Referring to the accompanying drawings, 1 designates the main supporting-frame of the mill that is suitably secured on the base or foundation 1^a. The main supporting-frame 1 of the mill essentially consists of opposite vertical tubular uprights 2, and a transverse casing portion 3, formed integrally with the opposite tubular uprights and connecting the same at an intermediate point to form a casing or housing for some of the gearing of the mill. The frame 1 is preferably sectional and is formed in duplicate upper and lower sections provided with upper and lower meeting flanges 4, suitably connected together when the various parts of the mill are assembled, and this sectional construction of the main supporting-frame of the mill provides a construction of frame that may be conveniently handled in shipping and setting up the mill.

The opposite vertical tubular uprights 2 of the frame 1 receive within the upper ends of the same the vertically-adjustable bearing-posts 5, that are provided with upper reduced extremities 6, arranged between depending parallel flanges 7, projected integrally from the lower sides of the journal-boxes 8, that are mounted on the upper ends of the said bearing-posts 5, and said journal-boxes 8 receive therein the ends of the upper horizontal wheel-shaft 9, on which is mounted, adjacent to one of the journal-boxes 8, the upper band-saw wheel 10, over which passes the upper portion of an endless band-saw 11 of the usual construction. The depending flanges 7 of the journal-boxes 8 and the upper reduced extremities 6 of the posts 5 receive transverse adjusting-bolts 12, that form an adjustable connection between the boxes 8 and the upper ends of the posts 5, and the bolt 12 for the journal-box at the rear end of the shaft 9 or at the end opposite the wheel 10 forms a sliding connection between such journal-box and the upper end of the bearing-post on which it is mounted, so that the said journal-box may be adjusted laterally or transversely by means of the adjusting-lever 13. The adjusting-lever 13 is pivotally mounted near its upper end, as at 14, at one side of one of the bearing-posts 5, and above its point of pivot the said lever is provided with a fork 15, that loosely engages over a rounded lug 16, cast on the under side and at one end of the journal-box 8 for the rear end of the wheel-shaft 9. The lever 13 is made of thin spring metal and normally presses inward toward one side of one of the uprights 2, and extending upward from the lower end and on the inner side of the lever 13 is a catch-rib or longitudinally-extended bearing-surface 17, adapted to slidably engage in the teeth of a notched segment or equivalent fixed catch 18, fitted on one of the uprights 2. The movement of the lever 13 in either direction provides for the transverse

movement or adjustment of the journal-box 8, connected therewith, in an opposite direction, thereby changing the line of the upper wheel-shaft 9, in order to provide means for securing the proper adjustment for leading the band-saw 11 from the wheels carrying the same in a proper line for sawing, as will be readily understood by those skilled in the art.

The vertically-adjustable bearing-posts 5, that work in the upper ends of the tubular uprights 2, have connected with the lower ends thereof the rack-bars 19, that work inside of the said uprights 2. The rack-bars 19, supporting the vertically-movable posts 5, mesh with the pinions 20, that are mounted, respectively, on separate longitudinally-alined adjusting-shafts 21 and 22. As illustrated in the drawings, the shafts 21 and 22 are arranged inside of the transverse casing portion 3 of the main supporting-frame, and said shafts are of different lengths, in order that the various parts of the mill may be properly positioned. Each of the shafts 21 and 22 has mounted on the inner adjacent ends thereof a cog-pinion 23, which meshes, respectively, with the parallel vertical rack-plates 24 and 25. The rack-plates 24 and 25 are arranged on a vertically-adjustable rack-frame 26, that is substantially rectangular in shape and is provided with a vertical longitudinal slot between the two rack-plates 24 and 25. The rack-plate 24 is preferably formed integral with the rack-frame 26 and meshes with the cog-pinion 23 on the inner end of the adjusting-shaft 21, and the other rack-plate, 25, is a separate plate and is mounted to slide on the frame 26 for longitudinal adjustment. Directly beyond the upper and lower ends of the vertically-adjustable rack-plate 25 the frame 26, carrying such rack-plate, is provided with the perforated flanges or ears 27, that receive an adjusting-screw 28. The adjusting-screw 28 engages in a vertical longitudinal opening 29, formed in the rack-plate 25 to provide for the vertical adjustment thereof, and the lower extremity of the said adjusting-screw 28 is adapted to be engaged by the nut 30, working below the lower of said flanges or ears 27, to secure the rack-plate 25 in its adjusted position, and at its upper end the screw 28 is provided with a suitable head 31, which provides for turning the screw to adjust the movable rack-plate 25.

The inner extremities of the adjusting-shafts 21 and 22 at one side of the cog-pinions 23 loosely receive the opposite ends of a lever-fork 31^a, fitted on the inner end of the tension-lever 32, which extends at one side of the main supporting-frame 1 and carries upon its outer end the tension-weight 33, which is sufficiently heavy for maintaining the band-saw 11 at the proper stretch or tension. The fork 31^a, at the inner end of the tension-lever 32, is provided in its opposite sides adjacent to the inner extremities of the shafts 21 and 22 with the pivot-openings 34, that loosely engage the fulcrum-studs 35, projected from opposite sides of an adjusting-nut 36, arranged between the separate parallel racks 24 and 25, carried by the rack-frame 26. The adjusting-nut 36 is interiorly threaded and accommodates therein the vertical adjusting-screw 37, fitted in the upper end of the frame 26 and carrying at its upper end above the top of said frame the hand-wheel 38, by means of which the frame 26 may be raised and lowered.

By turning the screw 37 the frame 26 can be raised or lowered, and will thereby communicate, through the medium of the rack-plates 24 and 25 and the pinions 23, the necessary motion to the shafts 21 and 22 to raise or lower the bearing-posts 5, as may be required in removing or replacing the saw, and when the mill is in operation the weighted tension-lever 32 will normally tend to force the nut 36 downward, and will therefore normally press the rack-frame 26 downward, so as to yieldingly maintain the band-saw at the proper stretch or tension. In addition to these adjustments it will be obvious that by adjusting the vertically-movable rack-plate 25 independently of the fixed rack-plate 24 a separate adjustment can be given to the bearing-support for the rear end of the upper wheel-shaft 9, and this adjustment is for the purpose of raising or lowering the rear end of the upper wheel-shaft, so as to compel the saw to run on the wheels carrying the same in its proper place for sawing, and also for accommodating the mill to different lengths of saws, as will be understood.

The lower ends of the tubular uprights 2, below the transverse casing portion 3, have fitted therein the depending bearing-posts 39. The depending bearing-posts 39 are provided with reduced lower ends 40, in which are fitted transversely-arranged supporting-pins 41, the extremities of which are fitted in side hanger-plates 42, arranged parallel at opposite sides of the reduced lower ends 40 of the posts and secured to opposite sides of the posts directly below the lower extremities of the uprights 2. The supporting-pins 41 loosely receive thereon the parallel perforated flanges 43, projected integrally from the upper sides of the journal-boxes 44, in which are journaled the ends of the lower wheel-shaft 45. Below the supporting-pins 41, on which they are loosely hung, the said journal-boxes 44 receive the adjusting-screws 46, that work against opposite sides of the reduced lower ends 40 of the posts 39, and provide means for the lateral or transverse adjustment of the journal-boxes 44, in order to secure the proper plumb adjustment of the lower wheel-shaft 45. The adjustment for the journal-boxes of the lower wheel-shaft 45 prevents the strain resulting from the driving-belt pulling sidewise from having a tendency to throw the lower wheel-shaft out of plumb.

The lower wheel-shaft 45 has mounted

thereon, adjacent to one of the journal-boxes 44, the lower band-saw wheel 46ª, that is arranged directly below the upper band-saw wheel 10, and receives thereover the lower portion of the band-saw 11. The lower wheel-shaft 45 has mounted thereon at an intermediate point the band-wheel 47, over which passes the usual driving-belt, and at one side of the band-wheel 47 the shaft 45 has mounted thereon the pulley 48, over which passes the belt 49, that also passes over a pulley 50, mounted on the short counter-shaft 51. The counter-shaft 51 is mounted in suitable bearings 52, arranged within the transverse casing portion 3, and carries the usual reversely-disposed beveled friction-wheels 53, that are adapted to operate against a cone friction-pulley 54, on the lower end of an adjusting-shaft 55, provided with a screw portion 56, working through an adjusting-block 57 at the inner end of the curved offstanding guide-arm 58, that carries the usual upper guide 59 for the saw. The ordinary adjusting device 60 is connected with the shaft 51, to provide for adjusting the wheel 53 against the pulley 54.

In the present invention the counter-shaft 51 also has mounted thereon at one side of the pulley 50 a cog-pinion 61, that meshes with an adjacent cog-wheel 62, mounted on one end of a short second counter-shaft 63. The second counter-shaft 63 is hung in suitable bearings 64, arranged on the frame of the mill, and on the end opposite the cog-wheel 62 the shaft 63 carries a beveled gear-pinion 65, meshing with a similar pinion 65ª, mounted on the inner end of the roll-shaft 66. The roll-shaft 66 is supported at one side of the main supporting-frame 1 of the mill, and has mounted thereon near its opposite ends circular heads 67, over which heads is fitted a hollow delivery-roll 68. The hollow delivery-roll 68 has motion imparted thereto through the medium of the gearing described, and is located directly opposite a fixed lumber-table 69, that is secured in position at one side of the main supporting-frame 1, directly under the guide-supporting arm 58 and at the inner side of the saw 11. The fixed lumber-table 69 is provided on its outer side with a pair of offstanding lugs 70, which provide convenient means for supporting the lower saw-guide in position directly under the upper saw-guide 59. When the mill is in operation, the sawed lumber is received by the table 69 and the roll 68, the latter of which assists to run the sawed lumber off at the rear end of the mill.

Suitably arranged above the lower band-saw wheel 46ª, within the main supporting-frame of the mill, is a short rock-shaft 71. The rock-shaft 71 is mounted in suitable bearing-hangers 72, arranged within the frame, and one end of said shaft extends out at one side of the mill-frame and has fitted on such outer end one end of an adjusting-lever 73, that provides means for rocking the said shaft when desired. The said rock-shaft 71 has mounted thereon, between the bearing-hangers therefor, a pair of offstanding rock-arms 74, which project downwardly at opposite sides of the rim of the wheel 46ª, and each of said rock-arms 74 have pivotally attached to their lower ends the brake-shoes 75, that are adapted to work against the inner side of the rim of the wheel 46ª at both sides of the web of such wheel, so that when the lever 73 is manipulated said brake-shoes can be clamped against the inner side of the rim of the wheel 46ª for the purpose of quickly stopping the mill to change saws when required or when an accident occurs. Besides performing this important function the brake-shoes 75 serve to clear the inner side of the rim of the wheel 46ª from accumulations of sawdust, which accumulations very often throw the wheel out of balance.

The rock-arms 74, carried by the shaft 71, are provided at their upper ends with integral offstanding arm extensions 76, the outer ends of which arm extensions lie above the top of the wheel 46ª and have fitted therein the ends of a pivot-rod 77, on which is mounted a self-adjusting steel scraper-plate 78. The self-adjusting steel scraper-plate is arranged to work between the arm extensions 76, and is provided with a lower inclined scraping edge 79, that is normally held in contact with the exterior periphery of the wheel 46 by means of the spring 80, coiled on the pivot-rod 77 and connected with the said scraper-plate 78. The scraper-plate 78 serves to keep the exterior periphery of the lower band-saw wheel free from accumulations of sawdust and thereby insure an even running of the band-saw.

From the above it is thought that the construction, operation, and advantages of the herein-described improvements in band-saw mills will be apparent without a further description, but at this point attention is called to the fact that the two separate adjustments for the upper wheel-shaft, namely, the transverse adjustment and the tilting adjustment secured by the independent adjustment for the rear end of the shaft, provide for the two movements or adjustments of such shaft, which are absolutely required to insure the band-saw running in its proper position on the band-wheel when in operation, since there is such a difference in the tension of different band-saws which are employed in connection with band-saw mills.

Changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a band-saw mill, the frame having opposite tubular uprights, vertically-adjustable posts mounted in the upper ends of said uprights, journal-boxes mounted on the upper ends of said posts, one of said boxes be-

ing supported to have a lateral sliding movement, a fixed catch arranged on one of said uprights below the slidably-supported journal-box, a laterally-swinging adjusting-lever pivoted to one of the vertically-adjustable posts and having a loose connection with the slidably-supported journal-box to provide for the lateral adjustment thereof, said lever also having a longitudinal extended bearing-surface adjustably and slidably engaging said fixed catch, the upper wheel-shaft carrying the upper band-saw wheel, and the lower wheel-shaft carrying the lower band-saw wheel, substantially as set forth.

2. In a band-saw mill, the frame having opposite tubular uprights, vertically-adjustable posts mounted within the upper ends of said uprights, journal-boxes adjustably fitted on the said bearing-posts, one of said journal-boxes being provided with a lug, an adjusting-lever arranged at one side of one of the tubular uprights and pivotally carried by one of the bearing-posts, said lever being provided at its upper extremity with a fork loosely engaging over said lug, a catch device for said adjusting-lever, the upper wheel-shaft mounted within said journal-boxes and carrying an upper band-saw wheel, and a lower wheel-shaft mounted at the lower ends of the tubular uprights and carrying a lower band-saw wheel, substantially as set forth.

3. In a band-saw mill, the frame having opposite tubular uprights, adjustably-supported journal-boxes arranged at the upper ends of said uprights, the upper wheel-shaft mounted in said upper journal-boxes and carrying an upper band-saw wheel, depending bearing-posts fitted in the lower ends of said uprights and provided with lower reduced ends and opposite parallel side hanger-plates, transversely-arranged supporting-pins fitted in the lower reduced ends of bearing-posts and in said side hanger-plates, lower journal-boxes having parallel perforated flanges receiving said supporting-pins, adjusting-screws fitted in the flanges of said journal-boxes and impinging against opposite sides of the reduced lower ends of the bearing-posts, and the lower wheel-shaft mounted in said lower journal-boxes and carrying a lower band-saw wheel, substantially as set forth.

4. In a band-saw mill, the combination of the frame having opposite tubular uprights, vertically-adjustable bearing-posts mounted in the upper ends of said uprights and carrying at their upper ends journal-boxes and at their lower ends within the uprights rack-bars, the upper wheel-shaft mounted in said journal-boxes and carrying a band-saw wheel, separate longitudinally-alined adjusting-shafts mounted within the frame and carrying pinions meshing with the rack-bars of said bearing-posts, gear-pinions fitted on the inner adjacent ends of said adjusting-shaft, and a weighted vertically-adjustable rack-frame carrying separate vertically-disposed rack-plates meshing respectively with the gear-pinions of the separate adjusting-shafts, substantially as set forth.

5. In a band-saw mill, the frame having opposite tubular uprights, vertically-adjustable bearing-posts mounted in the upper ends of said uprights and carrying at their upper ends journal-boxes and at their lower ends within the uprights rack-bars, the upper wheel-shaft mounted in said journal-boxes, separate longitudinally-alined adjusting-shafts mounted within the frame and carrying pinions meshing with the rack-bars of said bearing-posts, gear-pinions fitted on the inner adjacent ends of said adjusting-shafts, and a weighted vertically-adjustable rack-frame carrying separate vertically-disposed rack-plates meshing respectively with the gear-pinions of the separate adjusting-shafts, one of said rack-plates being independently vertically adjustable, substantially as set forth.

6. In a band-saw mill, the frame having opposite tubular uprights, bearing-posts mounted to slide within the upper ends of said uprights and carrying at their lower ends rack-bars, the upper wheel-shaft supported by said bearing-posts, separate longitudinally-alined adjusting-shafts carrying pinions meshing with said rack-bars, gear-pinions fitted on the inner adjacent ends of the adjusting-shafts, a vertically-adjustable rack-frame carrying separate vertically-disposed rack-plates meshing respectively with the gear-pinions of the adjusting-shafts, one of said rack-plates being vertically movable, an adjusting-screw mounted in said rack-frame and engaging with the movable rack-plate to adjust the same, a weighted lever connected with said rack-frame to normally lower the same, and means for positively raising and lowering the rack-frame, substantially as set forth.

7. In a band-saw mill, the frame having opposite tubular uprights, bearing-posts mounted within the upper ends of the uprights and carrying rack-bars at their lower ends, the upper wheel-shaft supported by said bearing-posts, separate longitudinally-alined adjusting-shafts carrying pinions meshing with the rack-bars, gear-pinions fitted on the inner adjacent ends of the adjusting-shaft, a vertically-adjustable rack-frame carrying separate vertically-disposed rack-plates meshing respectively with the gear-pinions of the separate adjusting-shafts, an interiorly-threaded nut arranged between the rack-plates and provided with oppositely-projected fulcrum-studs, a weighted tension-lever provided at its inner end with a fork fulcrumed on the studs of said nut and loosely fitted at its opposite extremities on the inner extremities of said adjusting-shafts, and an adjusting-screw mounted in the upper end of the rack-frame and engaging within said nut, substantially as set forth.

8. In a band-saw mill, the combination with

the band-saw wheel; of a lever-operated rock-shaft supported adjacent to the rim of said wheel, a pair of rock-arms mounted on said rock-shaft and arranged at opposite sides of the rim of the wheel, and brake-shoes attached to the ends of the rock-arms beyond the shaft and working against the inner side of the rim of the wheel, substantially as set forth.

9. In a band-saw mill, the combination with the band-saw wheel; of a lever-operated rock-shaft supported adjacent to the rim of the wheel, a pair of rock-arms mounted on said rock-shaft at opposite sides of the rim of the wheel and carrying brake-shoes working against the inner side of the rim of the wheel, said rock-arms being provided adjacent to the shaft with integral extensions, and a self-adjusting scraper-plate mounted between the arm extensions and contacting with the exterior periphery of the wheel, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES H. ROBERTS.

Witnesses:
J. M. VAN COTT,
NEAL WILKIN.